Bhagwant University
B.TECH IT

III SEMESTER

Subject Code	Name Of Subject	Teaching Hours			Credits
		L	T	P	
03BIT101	Digital Electronics	3	0	0	3
03BIT102	Electronic Devices & Circuits	3	1	0	4
03BIT103	Data Structures and Algorithms	3	0	0	3
03BIT104	Object Oriented Programming	3	0	0	3
03BIT105	Mathematics III	3	1	0	4
03BIT106	Electives (Any one of the following) 1 Linux & Shell Programming 2 Internet Technology 3 Management Information Systems	3	0	0	3
03BIT201	Data Structure Lab	0	0	3	2
03BIT202	Digital Electronics Lab	0	0	3	2
03BIT203	Electronics Lab	0	0	3	2
03BIT204	Programming in C++ Lab	0	0	3	2
03BIT301	Discipline & Extra Curricular Activities	0	0	4	1
TOTAL		18	2	16	29

IV SEMESTER

Subject Code	Name of Subject	Teaching Hours			Credits
		L	T	P	
04BIT101	Microprocessor and Interfaces	3	0	0	3
04BIT102	Principles of Programming Languages	3	0	0	3
04BIT103	Statistics and Probability Theory	3	1	0	4
04BIT104	Software Engineering	3	0	0	3
04BIT105	Discrete Mathematical Structures	3	1	0	4
04BIT106	Electives (Any one of the following) 1 Open Source Technology 2 Logic & Functional Programming 3 Analog & Digital Communication	3	0	0	3
04BIT201	Advance Object Oriented Programming Lab	0	0	3	2
04BIT202	Microprocessor Lab	0	0	3	2
04BIT203	Software Engineering Lab(CASE Tools)	0	0	3	2
04BIT204	Communication Lab	0	0	3	2
04BIT301	Discipline & Extra Curricular Activities	0	0	1	1
TOTAL		18	2	16	29

V SEMESTER

Subject Code	Name of Subject		Teaching Hours			Credits
			L	T	P	
05BIT101	Operating System		3	0	0	3
05BIT102	E-Commerce		3	0	0	3
05BIT103	Database Management Systems		3	1	0	4
05BIT104	Computer Architecture		3	1	0	3
05BIT105	Telecommunication Fundamentals		3	0	0	3
05BIT106	Electives (Any one of the following)		3	0	0	3
	1	Advanced Data Structures				
	2	Simulation and Modeling				
	3	IT For Forensic Sciences				
05BIT201	Operating Systems Simulation Lab		0	0	3	2
05BIT202	E-Commerce Lab		0	0	3	2
05BIT203	Database Lab		0	0	3	2
05BIT204	Digital Hardware Design Lab		0	0	3	2
05BIT301	Discipline & Extra Curricular Activities		0	0	4	1
TOTAL			18	2	16	29

VI SEMESTER

Subject Code	Name of Subject	Teaching Hours			Credits
		L	T	P	
06BIT101	Theory Of Computation	3	1	0	4
06BIT102	Computer Networks	3	0	0	3
06BIT103	Design and Analysis of Algorithms	3	0	0	3
06BIT104	Information Theory & Coding	3	1	0	4
06BIT105	Programming in Java	3	0	0	3
06BIT106	Electives (Any one of the following) 1 Distributed Processing 2 Advance Computer architecture 3 Human Computer Interface	3	0	0	3
06BIT201	Shell Programming Lab	0	0	3	2
06BIT202	GUI Design Lab	0	0	3	2
06BIT203	Design and Analysis of Algorithms Lab	0	0	3	2
06BIT204	Java Programming Lab	0	0	3	2
06BIT301	Discipline & Extra Curricular Activities	0	0	4	1
	TOTAL	18	2	16	29

VII SEMESTER

Subject Code	Name of Subject		Teaching Hours			Credits
			L	T	P	
07BIT101	Web Technology		3	0	0	3
07BIT102	Computer Graphics		3	0	0	3
07BIT103	Data Mining and Warehousing		3	0	0	3
07BIT104	Wireless Communication		3	0	0	3
07BIT105	Software Project management		3	0	0	3
07BIT106	Electives (Any one of the following)		3	0	0	3
	1	Speech Processing				
	2	Real Time Systems				
	3	Bio Informatics				
07BIT201	Web Technology Lab		0	0	3	2
07BIT202	Computer Graphics Lab		0	0	3	2
07BIT203	UML Lab		0	0	3	2
07BIT204	Project Stage I		0	0	3	2
07BIT205	Practical Training Seminar		0	0	3	2
07BIT301	Discipline & Extra Curricular Activities		0	0	4	1
TOTAL			**18**	**0**	**19**	**29**

VIII SEMESTER

Subject Code	Name of Subject	Teaching Hours			Credits
		L	T	P	
08BIT101	Software Testing & Validation	3	1	0	4
08BIT102	Data Compression Techniques	3	1	0	4
08BIT103	Information Assurance and Security	3	1	0	4
08BIT104	Electives (Any one of the following) 1 Mobile Computing 2 Network Programming 3 Artificial Intelligence	3	1	0	4
08BIT201	Data Mining and Warehousing Lab	0	0	3	2
08BIT202	Software Testing Lab	0	0	3	2
08BIT203	Data Compression Lab	0	0	3	2
08BIT204	Project Stage II	0	0	4	2
08BIT205	Seminar Presentation	0	0	3	2
08BIT301	Discipline & Extra Curricular Activities	0	0	4	1
TOTAL		12	4	16	27

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Theory: III Semester

DIGITAL ELECTRONICS

Course/Paper:03BIT-101

BIT Semester III

UNIT	CONTENT
I	Number systems, Coding Schemes: BCD, Excess-3, Grey, r's and (r-l)'s complement. Boolean Algebra, Fundamental theorems, Simplifications of Boolean expressions. Logic gates and their truth table. Gate Implementation and Truth table of Boolean functions.
II	Standard forms of Boolean functions. Minterm and Maxterm designation of functions. Simplification of functions onKarnaugh maps, Incompletely specified functions. Cubical representation of Boolean functions and determination of prime implicants. Selection of an optimal set of prime implicants. Multiple output circuits and map minimization of multiple output circuits. Tabular determination of multiple output prime implicants.
III	Combinational circuits – Adder, subtractor, encoder, decoder, multiplexer. Design of Combinational circuit using Multiplexers.
IV	Flip Flops: RS, J-K, D, T. Sequential circuits. Clock, pulse and level mode sequential circuits. Analysis and design of sequential circuits. Synthesis of state diagrams, Finite memory circuits, equivalence relations equivalent states and circuits, determination of classes of indistinguishable states and simplification by implicants tables. Mealy and Moore machines, state assignment and memory element input equations, Partitioning and state assignment.
V	Switching Devices. Positive and Negative logic of OR, AND, NOR, NAND, XOR and XNOR gates. Logic Family: RTL, DTL, DCTL, TTL, RCTL, ECL, HTL, MOS and CMOS logic circuit. Speed and delay in logic circuits, integrated circuit logic and noise immunity.

Reference Books:

1. Morris Mano: Digital Design,PHI .
2. S. Salivahanan and S. Arivazhagan, Digital Circuits and Design, Vikas Publishing House Pvt. Ltd.
3. R.P. Jain, Modern Digital Electronic, Tata Mc Graw Hill Publishing Company Ltd. New Delhi.
4. Gree- Dgital Electronics, pearson education
5. Brtee- digital computer fundamental, TMH

ELECTRONIC DEVICES & CIRCUITS

Course/Paper:03BIT-102

BIT Semester III

UNIT	CONTENT
I	Diode circuits: Diode as a circuit. Element, load line concept, clipping & clamping circuits, voltages multipliers.
II	Devices: construction, characteristics and working principles of the following devices. Diodes, BJT, JFET, MOSFET, UJT, photo diodes, LEDs, photo transistors. Solar cells. Thermistor, LDR.
III	Transistors: transistor characteristics, current components, current gains. Alpha and vita. Operating point. High bride model, h- parameter equivalent circuits. Ce, Cb and Cc configuration. Dc and ac analysis of Ce, Cc and Cb amplifiers. Evers- moll model. Biasing and stabilization techniques. Thermal run away, thermal stability. Equivalent circuits and blessing of JFETs and MOSFETs. Low frequency Cs and Cd JFET amplifiers. FET as a voltage variable resistor.
IV	Small signal amplifiers at low frequency: analysis of BJT and FET, dc and rc coupled amplifiers. Frequency response, midband gain, gains at low and high frequency. Analysis of dc and differential amplifiers, Millers' theorem. Cascading transistor amplifiers, Darlington and cascaded circuits. Emitter and source followers.
V	Oscillators: concept of feedback classification, criterion for oscillation. Tuned collector, Hartley, Colpitts , rc- phase shift , Wein bridge and crystal oscil ators, astable, monostable and bistable multivibrators . Schmitt trigger.

Reference Books

1. J. Millman & C.C.Halkias:Integrated Electronics,Tata Mc-Graw Hill.
2. Millman Grabel –Microelectronica,Mc-Graw Hill.
3. Robert Boylestand & L.Nashelsky Electronic devices & circui theory.
4. Sedra Smith- Microelectronic Circuits, Oxford Press, India.

DATA STRUCTURES AND ALGORITHMS

Course/Paper:03BIT-103

BIT Semester III

UNIT	CONTENT
I	Data Structure: Definition, Implementation, Operation, Application, Algorithm writing and convention. Analysis of algorithm, Complexity Measures and Notations. Arrays: Representation of arrays (multidimensional), Address calculation using column and row major ordering. Linked Lists : Implementation, Doubly linked list, Circular linked list, unrolled linked list, skip-lists, Splices, Sentinel nodes, Application (Sparse Matrix, Associative Array, Functional Programming)
II	Stacks : Definition, Implementation, Application (Tower of Hanoi, Function Call and return, Parentheses Matching ,Back -tracking, Expression Evaluation) Queues : Definition, deque, enque, priority queue, bounded queue, Implementation, Application
III	Tree: Definition of elements, Binary trees: Types (Full, Complete, Almost complete), Binary Search Tree, Traversal (Pre, In, Post & Level order), Pruning, Grafting. Application: Arithmetic Expressions Evaluation Variations : Indexed Binary Tree, Threaded Binary Tree, AVL tree, Multi-way trees, B tree, B+ tree, Forest, Trie and Dictionary
IV	Graphs: Elementary definition, Representation (Adjacency Matrix, Adjacency Lists) Traversal (BFS,DFS) Application: Spanning Tree (Prim and Kruskal Algorithm), Dijkstra's algorithm, and Shortest path algorithms.
V	Sorting: Bubble, Selection, Insertion, Quick, Radix, Merge, Bucket, Heap, Searching: Hashing, Symbol Table, Binary Search, Simple String Searching

Reference Books

1. Data Structures: Schaum's, Tata McGraw-Hill
2. Aron M. Tannenbaum & Others: Data Structures using C, Prentice Hall, 1992.
3. Aho A.V & Ullman J.E. : Data Structure & Algorithms.
4. Data Structures :G.S.Baluja,Dhanpat Rai Publication.
5. Data Structures and Algo,Yentendra Mohan Sharma, Ashirwad Publication.

OBJECT ORIENTED PROGRAMMING

Course/Paper:03BIT-104

BIT Semester III

UNIT	CONTENT
I	Introduction: Review of structures in C, accessing members of structures using structure variables, pointer to structures, passing structures to functions, structures as user defined data types.
II	Introduction to programming paradigms- (Process oriented and Object oriented). Concept of object, class, objects as variables of class data type, difference in structures and class in terms of access to members, private and public Basics of C++: Structure of C++ programs, introduction to defining member functions within and outside a class, keyword using, declaring class, creating objects, constructors & destructor functions, Initializing member values with and without use of constructors, simple programs to access & manipulate data members, cin and cout functions. Dangers of returning reference to a private data member, constant objects and members function, composition of classes, friend functions and classes, using this pointer, creating and destroying objects dynamically using new and delete operators. Static class members, container classes and iterators, proxy classes. Members of a class, data & function members. Characteristics of OOP- Data hiding, Encapsulation, data security.

III	Operator overloading: Fundamentals, Restrictions, operator functions as class member's v/s as friend functions. Overloading stream function, binary operators and unary operators. Converting between types.
IV	Inheritance: Base classes and derived classes, protected members, relationship between base class and derived classes, constructors and destructors in derived classes, public, private and protected inheritance, relationship among objects in an inheritance hierarchy, abstract classes, virtual functions and dynamic binding, virtual destructors.
V	Multiple inheritance, virtual base classes, pointers to classes and class members, multiple class members. Templates, exception handling.

Reference Books

1. How to Program C++, Dietel, Pearson
2. Mastering C++ By K.R.Venugopal, TMH
3. Object Oriented Programming in C++ By Robert Lafore, Pearson
4. Object Oriented Design & Modelling, Rambaugh, PHI

MATHEMATICS III

Course/Paper:03BIT-105

BIT Semester III

UNIT	CONTENT
I	Introduction: Engineering application of optimization, Statement and classification of optimization problem, single variable and multivariable optimization with and without constraints.
II	Linear Programming: Formulation of Linear Programming problem, Graphical Approach, General Linear Programming problem, Simplex Method. Duality in Linear Programming and Transportation Problems.
III	Project Scheduling: Project Scheduling by PERT and CPM Network Analysis. Sequencing Theory: General Sequencing problem n-jobs through 2 machines & 3 machines and 2-jobs through machine.
IV	Transform Calculus – Laplace Transform with its simple properties, applications to the solution of ordinary and partial differential equation having constant coefficients with special reference to the wave and diffusion equation. Fourier transforms and solution of particular differential equation with constant coefficient.
V	Numerical Methods – Solution of Algebraic and transcendental equations, interpolation- finite differences, inverse interpolation, numerical differentiation and integration, numerical solution of differential equations and partial differential equations, solution of difference equation.

Reference Books

1. Gokhroo et al:Higher Engg mathematics-III.
2. Schaums outline series on Matrix Algebra.
3. Grewal- Maths for Engineers.
4. R.K. Jain & S.R.K. Iyenger, Advance Engineering Mathematics, Narosa Publication House, 2002.
5. Chandrika Prasad, Advanced Mathematics for Engineers, Prasad Mudralaya, 1996

LINUX SHELL PROGRAMMING

Course/Paper:03BIT-106.1

BIT Semester III

UNIT	CONTENT
I	Introduction: Logging in, changing password (passwd command only), man, xman, info commands to access on line help. Simple commands like ls, cp, mv, grep, head, tail, sort, uniq, diff, echo, date, which, whereis, whatis, who, finger w (option and variations included). Directory commands, access permissions, changing access permissions for files and directories, hard & symbolic links. Environment and path setting.
II	vi editor: Creating and editing files, features of vi, insertion deletion, searching, substitution operations, yank, put, delete commands, reading & writing files, exrc file for setting parameters, advance editing techniques. vim(improved vi). Programming utilities: Compiling & linking C, C++ programs, make utility, debugging C programs using gdb, system call.
III	Introduction to X-window system: x-window as client/ server system, concept of window manager, remote computing & local displays, xinitrc file, customize X work environment and applications, customizing the fvwm window manager.
IV	Shell: Meaning and purpose of shell, Introduction to types of shell. The command line, standard input and standard output, redirection, pipes, filters special characters for searching files and pathnames. Bourne Again SHell: shell script-writing and executing, command separation & grouping, redirection, directory stack manipulation, processes, parameters & variables, keyword variables.
V	Shell Programming: Control structures, the Here document, expanding NULL or USET variables, Builtins, functions, history, aliases, job control, filename substitution. source code management- RCS and CVS. awk utility.

Reference Books

1. A practical Guide to Linux, Sobell, Pearson.
2. A Practical Guide to Linux Commands, Editors, and Shell Programming, Sobell, Pearson.
3. A Practical Guide to Fedora and Red Hat Enterprise Linux, Sobell, 5e, Pearson

INTERNET TECHNOLOGY

Course/Paper:03BIT-106.2

BIT Semester III

UNIT	CONTENT
I	INTRODUCTION : Internet connection concepts- server, client and parts, Domain Name Systems, Telephone ,cable and satellite connections- Dialup, ISDN, ADSL and leased line based connection, cable and DSS accounts ,Web TV and Intranets, ISP features.
II	INTRANETS: What is Intranet? – Intranet Vs LANs Components of an Intranet Workstations and client software ,Server and Network operating systems, Network Cards, Cabling and Hubs, Steps for creating an Intranet, Maintenance and connecting to Internet.
III	E-MAIL TECHNOLOGY: Features and Concepts- Message headers, Address book, Attachment, Filtering and forwarding mails.
IV	VIDEO CONFERENCING AND INTERNET TELEPHONY: Voice vs Video conferencing, Video conferencing hardware and features of video conferencing software, digital telephony as ISDN application, H 323 protocols and multi-point conferencing.
V	WEB TECHNOLOGY: Elements of the Web- Clients and servers, Languages and protocols Web page and Websites, special kinds of Web sites, Web Resources- Search Engines, Message boards, clubs, News groups and chat, Web page creation concepts- planning, Navigation, Themes and Publishing , Analyzing web traffic- Log filedata, analyzing log files and products for analyzing web traffic.

Reference Books

1. Internet Technology,Dr. Ranjit singh,Ajit Singh Poonia,CBC pub.
2. Internet Technology ,by Margaret Levin YoungTata McGraw Hill publication

MANAGEMENT INFORMATION SYSTEMS

Course/Paper:03BIT-106.3

BIT Semester III

UNIT	CONTENT
I	Introduction: MIS concept, Definition, role & Impact of MIS, Process of management, organization structure & behavior.
II	Basic of Management Information System: Decision Making, Information concepts, System concepts & control Types of system handling system complexity System development model.
III	Development of Management Information System: Requirement and implementation of MIS, Choice of information Technology for Management Information System.
IV	Application of Management Information system: Application in manufacturing sector using for personal management, Financial management, Production Management, Material Management, Marketing Management Application in Service Sector.
V	Enterprise Resource Planning (ERP): EMS, ERP, Benefits implementation, EMS & MIS.Case Studies: Application of SAP technologies in manufacturing sector.

Reference Books

1. James A.O Brien: Management Information Systems,Galgotia Pubn., 1994.
2. Wigarders K, Svensson A., Sehong L. : Structured Analysis & Design of Information Systems, Mcgraw-Hill book Co. 1986.
3. Jawedker: Information System for Management.
4. K.C. Laudon. and J.P. Laudon, Management Information System:Managing The Digital Firm, PHI

Laboratories: III Semester

DATA STRUCTURE LAB

Course/Paper:03BIT-201

BIT Semester III

1. Program on array searching, sorting (Bubble sort, Quick sort, Marge sort etc.)

2. Program to insert element at desire position, replacing element, deletion in

3. Various matrices operations.

4. Various strings programs.

5. Implementation of stack and queue using array

6. Implementation of stack and queue using link lists

7. Implementation of circular queue using link lists.

8. Polynomial addition, multiplication.

9. Two-way link lists programs.

10. Infix to postfix/prefix conversion.

11. BST implementation (addition, deletion, searching).

12. Graph traversal (BFS, DFS).

DIGITAL ELECTRONICS LAB

Course/Paper:03BIT-202
BIT Semester III

1. Experimental study of characteristics of CMOS integrated circuits.

2. Interfacing of CMOS to TTL and CMOS.

3. Study of various combinatorial circuits based on: AND/NAND Logic blocks and OR/NOR Logic blocks.

4. Study of following combinational circuits: Multiplexer; Demultiplexer and Encoder. Verify truth tables of various logic functions.

5. To study various waveforms at different points of transistor bistable multivibrator and its frequency variation with different parameters.

6. To study transistor astable multivibrator.

7. To design a frequency driver using IC-555/timer.

8. To study Schmitt trigger circuit.

9. To study OP-AMP as Current to voltage and voltage to current converter comparator.

10. BCD to binary conversion on digital/IC trainer.

11. Study various Flip flops and construct Parallel-in-Serial-out register. Testing of digital IC by automatic digital IC trainer.

ELECTRONICS LAB

Course/Paper:03BIT-203
BIT Semester III

1. Study the following devices:

        (a) Analog & digital multimeters

        (b) Function/Signal generators

        (c) Regulated D.C. power supplies (constant, voltage and constant current operations).

2. Study of analog CRO measurement of time period, amplitude, frequency and phase angle using Lissajous figures.

3. Application of diode as clipper and clamper.

4. Plot V-I characteristic of zener diode & study zener diode as voltage, reverse Saturation current and static & dynamic resistances.

5. Plot V-I characteristic of zener diode & study zener diode as voltage regulator. Observe the effect of load changes and determine load limits of the voltage regulator.

6. Plot frequency response curve for audio amplifier and to determine gain bandwidth product.

7. Plot drain current-drain voltage and drain current-gate bias characteristics of field effect transistor and measurement of I & VP.

8. Plot gain: frequency characteristic of two stages RC coupled amplifier and calculate its bandwidth and compare it with theoretical value.

9. Plot gain: frequency characteristic of two stages RC coupled amplifier and calculate its bandwidth and compare it with theoretical value.

10. Plot input and output characteristics of BJT in CB, CC and CE configurations. Find their h-parameters.

11. Study half wave rectifier and effect of filter network on D.C. voltage output and ripple factor.

12. Study bridge rectifier and measure the effect of filter network on D.C. voltage output and ripple factor.

PROGRAMMING IN C++ LAB

Course/Paper:03BIT-204
BIT Semester III

1. To write a simple program for understanding of C++ program structure without any CLASS declaration. Program may be based on simple input output, understanding of keyword using.

2. Write a C++ program to demonstrate concept of declaration of class with public & private member, constructors, object creation using constructors, access restrictions, defining member functions within and outside a class. Scope resolution operators,

3. Accessing an object's data members and functions through different type of object handle name of object, reference to object, pointer to object, assigning class objects to each other.

4. Program involving multiple classes (without inheritance) to accomplish a task. Demonstrate composition of class.

5. Demonstration Friend function friend classes and this pointer.

6. Demonstration dynamic memory management using new & delete & static class members.

7. Demonstration of restrictions an operator overloading, operator functions as member function and/ or friend function, overloading stream insertion and stream extraction, operators, overloading operators etc.

8. Demonstrator use of protected members, public & private protected classes, multilevel inheritance etc.

9. Demonstrating multiple inheritance, virtual functions, virtual base classes, abstract classes

Theory: **IV Semester**

MICROPROCESSOR AND INTERFACES

Course/Paper:04BIT-101

BIT Semester IV

UNIT	CONTENT
I	Introduction to Micro Computer Systems: Microprocessors, microcontroller and microcomputer devices, Machine and assembly language, Bus concept. Architecture & Pinout of 8085A.
II	Assembly Language and Programming in 8085: Instruction set, Program structures (sequential, conditional, iterative), Macros and subroutines, Stack, Counter and timing delay, interrupt structure and its programming.
III	Peripherals and their interfacing with 8085-I: Memory Interfacing, Interfacing I/O ports, Data transfer schemes Synchronous, asynchronous, interrupt driven), Architecture & interfacing of PPI 8255, Data Converters and Timer 8254.
IV	Peripherals and their interfacing with 8085-II: Architecture & interfacing of- DMA controller 8257, interrupt Controller 8259A, USART 8251, Level Converters MC 1488 and MC 1489, Current loop, RS 232 C and RS 422 A.
V	Comparative study of 8085 A, 8086 and 8088 (Pin out, internal architecture, timing diagrams), Instruction format and addressing modes – Data and Branch related. Features of Pentium processor, MMX and Dual core processor.

Reference Books

1. Gaonkar: Microprocessor and its Applications..
2. Liu,Y,Gibson, G.A. : Microcomputer systems: The 8086/8088 family, Prentice-Hall, 2nd Edn. 1986.
3. Parson, AJ. : Microprocessors: Essentaial, Components and System, Galogtla Publ. Pvt. Ltd.
4. INTEL-Microcontroller handbook.
5. Ayle- 8051 Microcontroller,penram press.

PRINCIPLES OF PROGRAMMING LANGUAGES

Course/Paper:04BIT-102

BIT Semester IV

UNIT	CONTENT
I	Programming Language: Definition, History, Features. Issues in Language Design: Structure and Operation of computer, Programming Paradigms. Efficiency, Regularity. Issues in Language Translation: Syntax and Semantics.
II	Specifications and Implementation of Elementary and Structured Data Types. Type equivalence, checking and conversion. Vectors and Arrays, Lists, Structures, Sets, Files
III	Sequence control with Expressions, Conditional Statements, Loops, Exception handling. Subprogram definition and activation, simple and recursive subprogram, subprogram environment.
IV	Scope – Static and Dynamic, Block structures, Local Data and Shared Data, Parameters and Parameter Transmission. Local and Common Environments, Tasks and Shared Data.
V	Abstract Data type, information hiding, encapsulation, type definition. Static and Stack-Based Storage management. Fixed and Variable size heap storage management, Garbage Collection.

Reference Books

1. Programming languages: design and implementation, Terrence W. Pratt.
2. Programming languages: concepts and constructs, Ravi Sethi, ISBN 9780201590654.
3. Programming Language Pragmatics, Scott, ELSEVIER

STATISTICS & PROBABILITY THEORY

Course/Paper:04BIT-103

BIT Semester IV

UNIT	CONTENT
I	Introduction & Discrete random variables Sample space, events, algebra of events, Bernoulli's trials, Probability & Baye's theorem. Random variable & their event space, probability generating function, expectations, moments, computations of mean time to failure, Bernoulli & Poisson processes.
II	Discrete & continuous distributions Probability distribution & probability densities: Binomial, Poisson, normal rectangular and exponential distribution & their PDF's, moments and MGF's for above distributions.
III	Correlation & Regression Correlation & regression: Linear regression, Rank correlation, Method of least squares Fitting of straight lines & second degree parabola. Normal regression and correlation analysis.
IV	Queuing Theory Pure birth, pure death and birth-death processes. Mathematical models for M/M/1, M/M/N, M/M/S and M/M/S/N queues.
V	Discrete Parameter mark on chains: M/G/1 Queuing model, Discrete parameter birth-death process.

Reference Books

1. Probability, Statistics & Random Process By T. Veerajan, TMH
2. Fundamental of Mathematical Statistics By S.C.Gupta and V.K. Kapoor, Sultanchand & sons.
3. Statistics and Probability Theory By Jain & Rawat ,CBC
4. Statistics and Probability Theory By Schaum's, T.M.H.

SOFTWARE ENGINEERING

Course/Paper:04BIT-104

BIT Semester IV

UNIT	CONTENT
I	System Analysis: Characteristics, Problems in system Development, System Level project Planning, System Development Life cycle (SDLC), computer system engineering system analysis, modeling the architecture, system specification.
II	Software Project Management: Objectives, Resources and their estimation, LOC and FP estimation, effort estimation, COCOMO estimation model, risk analysis, software project scheduling. Software Development : Life Cycle (SWDLC), SWDLC models software engineering approaches
III	Requirement Analysis: Requirement analysis tasks, Analysis principles. Software prototyping and specification data dictionary finite state machine (FSM) models. Structured Analysis: Data and control flow diagrams, control and process specification behavioral modeling, extension for data intensive applications.
IV	Software Design: Design fundamentals, Effective modular design: Data architectural and procedural design, design documentation.

V	Object Oriented Analysis: Object oriented Analysis Modeling, Data modeling. Object Oriented Design: OOD concepts and methods class and object definitions, refining operations. Class and object relationships, object modularization.Introduction to Unified Modeling Language

Reference Books

1. Pressman Roger: Software Engineering -A Practitioner's Approach; Tata McGraw Hill, N.Delhi,-1991.
2. Jalote pankaj: An Integrated Approach to Sofware Engineering; Narosa, New delhi, 1991.
3. Shooman, M. : Software Engineering, McGraw-Hill.
4. Rajib Mall, Fundamentals of Software Engineering, PHI.
5. K. K. Aggarwal and Yogesh Singh, Software Engineering, New Age International.

DISCRETE MATHEMATICAL STRUCTURES

Course/Paper:04BIT-105

BIT Semester IV

UNIT	CONTENT
I	Formal Logic: Statement, Symbolic Representation and Tautologies, Quantifiers, Predicator and validity, Normal form. Propositional Logic, Predicate Logic, Logic Programming and Proof of correctness.
II	Proof, Relation and Analysis of Algorithm Techniques for theorem proving: Direct Proof, Proof by Contra position ,Proof by exhausting cares and proof by contradiction, principle of mathematical induction, principle of complete induction. Recursive definitions, solution methods for linear, first-order recurrence relations with constant coefficients.
III	Graph Theory: Graphs - Directed and Undirected, Eulerian chains and cycles Hamiltonian chains and cycles, Trees, chromatic number, connectivity and other graphical parameters Applications. Polya's Theory of enumeration and its applications.
IV	Sets and Functions: Sets, relations, functions, operations, equivalence relations, relation of partial order, partitions ,binary relations. Transforms: Discrete Fourier and Inverse Fourier Transforms in one and two dimensions, discrete Cosine transform.
V	Monoids and Groups: Groups, Semigroups and Monoids cyclic semi graphs and sub monoids, Subgroups and cosets. Congruence relations on semi groups. Morphism, Normal sub groups. Structure off cyclic groups, permutation groups and dihedral groups elementary applications in coding theory.

Reference Books

1. C.l.Liu ; elements of Discrete Mathematics Tata McGraw Hill publishing Company Ltd., 2000.
2. John Truss : Discrete Mathematics for Computer Scientists, Pearson Education, Asia, 2001.
3. Lipschutz : Discrete Mathematics, Tata Mc. Graw Hill India.
4. Kenneth H. Rosen, Discrete Mathematics and its application, TMH.
5.V.B.L.Chaurasiya, Discrete Mathematics, Genius Publication.

OPEN SOURCE TECHNOLOGY

Course/Paper:04BIT-106.1

BIT Semester IV

UNIT	CONTENT
I	OST overview: Evolution & development of OST and contemporary technologies, Factors leading to its growth. Open Source Initiative (OSI), Free Software Foundation and the GNU Project, principle and methodologies. Contexts of OST (India & international). Applications of open source (open source teaching and open source media) Risk Factors. Myths regarding open source.

II	Philosophy of Software Freedom, Free Software, OSS, Closed software, Public Domain Software, Shared software, Shared source. Detail of few OSS like Open Audio, Video, 2d & 3d graphics software, system tools, office tools,Networking & internet, Security, Educational tools and Games.
III	Open Source Development Model, Starting and Maintaining an Open Source Project, Open Source Hardware, Open Source Design, Ongoing OS Projects (i.e. examples of few good upcoming software projects.) Case Study: - Linux, Wikipedia.
IV	Licenses and Patents: What Is A License, How to create your own Licenses? Important FOSS Licenses (Apache, BSD, GPL, LGPL), copyrights and copylefts, Patents
V	Social and Financial impacts of open source technology, Economics of FOSS: Zero Marginal Cost, Incomegeneration opportunities, Problems with traditional commercial software, Internationalization, Open Source as a Business Strategy.

LOGIC AND FUNCTIONAL PROGRAMMING

Course/Paper:04BIT-106.2

BIT Semester IV

UNIT	CONTENT
I	PROPOSITIONS AND PREDICATES: Evaluation of constant propositions, Evaluation of proposition in a state. Precedence rules for operators, Tautologies, Propositions a sets of states and Transforming English to propositional form. Introduction to first-order predicate logic, Quantifiers and Reasoning.
II	LOGIC PROGRAMMING USING PROLOG: Constants, Goals and Clauses, Facts, Rules, Semantics, Rules and Conjunction, Rules and Disjunction, Search strategy, Queries.
III	ADVANCED LOGIC PROGRAMMING USING PROLOG: - Unification, Recursion, Lists, Cut operator, and Sorting. Data structures, Text strings, Searching state space, Operators and their precedence, and Parsing in Prolog.
IV	FUNCTIONAL PROGRAMMING: Introduction to lambda calculus-Syntax and semantics, Computability and correctness, Lazy and Eager Evaluation Strategies, comparison of functional and imperative languages.
V	FUNCTIONAL PROGRAMMING USING HASKELL: Introduction, lists, Userdefined data types, type classes, and arrays in Haskell. Input/Ouput in Haskell – type classes IO and Monad, Simple applications/programs in Haskell.

Reference Books

1. Logical foundations of functional programming By Gerard Huet, Addison- Wesley Longman Publishing Co.
2. Mathematical Logic for Computer Science By M. Ben- Ari, Prentice Hall.
3. The Essence of Logic By John Kelly, Prentice-Hall of India.

ANALOG AND DIGITAL COMMUNICATION

Course/Paper:04BIT-106.3

BIT Semester IV

UNIT	CONTENT
I	Modulation of Signals: Principles of Analog modulation technique like AM, FM, PM, SSB, Generation & detection, Frequency division multiplexer. Pulse modulation: Pulse transmission over band-limited signals, sampling theory, pulse amplitude modulation.
II	Digital Communication: PCM, DCSM, DM, ADM, comparison of above systems on the basis of performance criteria such as bit transmission, signaling rate, error probability, S/N ratio, bandwidth requirement. ISI & Eye diagram.

III	Digital Modulation technique: Data transmission using techniques such as PSK, FSK, QFSK (QAM), MSK Inter system comparison.
IV	Introduction to communication channel: Transmission line-primary and secondary line constant, telephone linesand cable, public switch telephone network (Electronic exchange). Introduction of fiber optic communication-Principle of light communication in fiber, losses in fiber, dispersion, light source and photo detector, connector and splicer.
V	Introduction to coding technique: Information theory, channel capacity, Shannon's theorem, source coding, error control coding, error detection and correction, block code, cycle code, line code channel throughput and efficiency.

Reference Books

1. J.Milliman & C.C. Halkias – Integrated Electronics: TMH
2. Robert Boylestand & L.Nashelsky Electronic devices & circui theory
3. Sedra Smith- Microelectronic Circuits, Oxford Press, India.
4. Brtee- digital computer fundamental, TMH.
5. Mano – Digital Design, Pearson Education.

Laboratories: IV Semester

ADVANCE OBJECT ORIENTED PROGRAMMING LAB
Course/Paper:04BIT-201
BIT Semester IV

1. Write a C++ Object Oriented Code for Huffman Coding & Decoding. The code must have implementation of Binary tree, binary

2.Search, Scanning of Input Stream, Generation of Code. The input Stream and codes may be stored in files.

3. Write a C++ Object Oriented Code for representing a graph using adjacency list. Perform depth first and breadth first search starting

from any node. Also find the shortest path between single sources all destinations. Also carry out topological sorting.

4. Create a C++ template for matrix. Include procedures for multiplication of 2 matrices. Use the same class for multiplication of more

than two matrices.

5. Create a C++ class for implementation of AVL tree to store a symbol table.

6. Create a new string class say NewString. Define functions as defined in the system string class.

MICROPROCESSORS LAB
Course/Paper:04BIT-202
BIT Semester IV

1. Study of hardware, functions, memory, and operations of 8085 kit.

2. Program to perform integer addition (two and three numbers 8 bit)

3. Program to perform multiplication (two 8 bit numbers).

4. Program to perform division (two 8 bit numbers).

5. Transfer of a block data in memory to another place in memory in forward

6. Swapping of two block data in memory.

7. Addition of 10 numbers using array.

8. Searching a number in an array.

9. Sorting of array (ascending, descending order).

10. Print Fibonacci sequence. (15 elements)

11. To insert a number at correct place in a sorted array.

12. Interfacing seven segment display using 8255.

SOFTWARE ENGINEERING LAB

Course/Paper:04BIT-203
BIT Semester IV

1. Course Registration System Case

2. Quiz System

3. Online ticket reservation system

4. Remote computer monitoring

5. Students marks analyzing system

6. Expert system to prescribe the medicines for the given symptoms

7. Platform assignment system for the trains in a railway station

8. Stock maintenance

9. Student Marks Analyzing System

10. Online Ticket Reservation System

11. Payroll System

12. Export System

COMMUNICATION LAB

Course/Paper:04BIT-204
BIT Semester IV

1. Harmonic analysis of a square wave of modulated waveform

2. Observe the amplitude modulated waveform and measures modulation index. Demodulation of the AM signal

3. To modulate a high frequency carrier with sinusoidal signal to obtain FM signal. Demodulation of the FM signal

4. To observe the following in a transmission line demonstrator kit :

    i. The propagation of pulse in non-reflecting Transmission line.

    ii. The effect of losses in Transmission line.

    iii. The resonance characteristics of al half wavelength long x-mission line.

5. To study and observe the operation of a super heterodyne receiver

6. To modulate a pulse carrier with sinusoidal signal to obtain PWM signal and demodulate it.

7. To modulate a pulse carrier with sinusoidal signal to obtain PPM signal and demodulate it.

8. To observe pulse amplitude modulated waveform and its demodulation.

9. To observe the operation of a PCM encoder and decoder .To considers reason for using digital signal x-missions of analog signals.

10. Produce ASK signals, with and without carrier suppression, Examine the different processes required for demodulation in the two cases.

11. To observe the FSK wave forms and demodulate the FSK signals based on the properties of (a) tuned circuits (b) on PI.L.

Theory: V Semester

OPERATING SYSTEMS

Course/Paper:05BIT-101

BIT Semester V

UNIT	CONTENT
I	Introduction & need of OS, Layered architecture/logical structure of OS, Types of OS, OS as resource manager & virtual machine, OS services, BIOS, System calls/Monitor calls, Firmware-BIOS, Bootstrap loader. Process Management: Process model, creation, termination, states & transitions, hierarchy, context switching, process implementation, process control block, Basic System calls-Linux & windows. Threads: processes v/s threads, threading, concepts, models, kernel & user level threads, thread usage, benefits, and multithreading models.
II	Interprocess communication : Intro to message passing, Race condition, critical section problem, mutual exclusion with busy waiting- disabling interrupts, lock variables, strict alteration, Peterson's solution, TSL instructions, busy waiting, sleep & wakeup calls, semaphore, monitors, classical IPC problems. Process scheduling : Basic concepts, classification, CPU & I/O bound, CPU scheduler- short, medium & long term dispatcher, scheduling- preemptive & non-preemptive, Static & Dynamic Priority, Co-operative & Non-cooperative, Criteria /Goals/Performance Metrics, scheduling algorithms- FCFS, SJFS, shortest remaining time, Round Robin, Priority scheduling, multilevel queue scheduling, multilevel feedback queue scheduling, Fair share scheduling.
III	Deadlock: System model, resource types, deadlock problem, deadlock characterization, methods for deadlock handling, deadlock prevention, deadlock avoidance, deadlock detection, recovery from deadlock. Memory Management: concepts, functions, logical & physical address space, address binding, degree of multiprogramming, swapping, static & dynamic loading- creating a load module, loading, static & dynamic linking, shared libraries, memory allocation schemes- first fit, next fit, best fit, worst fit, quick fit. Free space Management- bitmap, link list/free list, buddy's system, memory protection & sharing, relocation & address translation..
IV	Virtual Memory: concept, virtual address space, paging scheme, pure segmentation & segmentation with paging scheme hardware support & implementation details, memory fragmentation, demand paging, pre-paging, working set model, page fault frequency, thrashing, page replacement algorithms- optimal, NRU, FIFO, second chance, LRU, LRU –approximation clock, WS clock; Belady's anomaly, distance string, design issues for paging system- local v/s global allocation policies, load control, page size, separate instruction, & data spaces, shared pages, cleaning policy, TLB (Translation look aside buffer) reach, inverted page table, I/O interlock, program structure, page fault handling, Basic idea of MM in Linux & windows..
V	File system: concepts, naming, attributes, operations, types, structure, file organization & access(Sequential, Direct, Index Sequential) methods, memory mapped files, directory structures-one level, two level, hierarchal/tree, acyclic graph, general graph, file system mounting, file sharing, path name, directory operations, overview of file system in Linux & windows. Input/output subsystems- concepts, functions/goals, input/output devices- block & character, spooling, disk structure & operation, disk attachment, disk storage capacity, disk scheduling algorithm- FCFS, SSTF, scan scheduling, C-scan scheduling.

Reference Books

1. ASilberschartz and Peter B Galvin:Operating System Principals, Wiley India Pvt. Ltd.
2. Achyut S Godbole: Operating Systems, Tata McGraw Hill.
3. Tanenbaum : Modern Operating System, Prentice hall.
4. DM Dhamdhere: Operating Systems- A Concepts Based Approach, Tata McGraw Hill
5. Charles Crowly:Operating System A Design- Oriented Approach, Tata McGraw Hill.

E-COMMERCE

Course/Paper:05BIT-102

BIT Semester V

UNIT	CONTENT
I	Introduction: Motivation, Forces behind E-Commerce Industry Framework, Brief history of ECommerce, Inter Organizational E-Commerce Intra Organizational E-Commerce, and Consumer to Business Electronic Commerce, Architectural framework, Network Infrastructure for E-Commerce Network Infrastructure for ECommerce, Market forces behind I Way, Component of I way Access Equipment, Global Information Distribution Network, Broad band Telecommunication.

II	Mobile Commerce: Introduction to Mobile Commerce, Mobile Computing Application, Wireless Application Protocols, WAP Technology, Mobile Information Devices, Web Security, Introduction to Web security, Firewalls & Transaction Security, Client Server Network, Emerging Client Server Security Threats, firewalls & Network Security.
III	Encryption: World Wide Web & Security, Encryption, Transaction security, Secret Key Encryption, Public Key Encryption, Virtual Private Network (VPM), Implementation Management Issues.
IV	Electronic Payments: Overview of Electronics payments, Digital Token based Electronics payment System, Smart Cards, Credit Card I Debit Card based EPS, Emerging financial Instruments, Home Banking, Online Banking.
V	Net Commerce: EDA, EDI Application in Business, Legal requirement in E -Commerce, Introduction to supply Chain Management, CRM, issues in Customer Relationship Management.

Reference Books

1. R David Whitely; Electronic Commerce Strategy, technology, Applications Tate McGraw Hill
2. Soka: From EDI to E-Commerce; McGraw Hill, 1995
3. Harley Hahn-The Internet Complete Reference Tate McGraw Hill
4. Concept of E-Commerce, Adash K.Pandey, S.K. Kataria & Sons
5. E-Commerce, J.S.Pilaniya, Genius Publications

DATA BASE MANAGEMENT SYSTEM

Course/Paper:05BIT-103

BIT Semester V

UNIT	CONTENT
I	INTRODUCTION TO DATABASE SYSTEMS: Overview and History of DBMS. File System vs DBMS .Advantage of DBMS Describing and Storing Data in a DBMS. Queries in DBMS. Transaction management and Structure of a DBMS.
II	ENTITY RELATIONSHIP MODEL: Overview of Data Design Entities, Attributes and Entity Sets, Relationship and Relationship Sets. Features of the ER Model-Key Constraints, Participation Constraints, Weak Entities, Class Hierarchies, Aggregation, Conceptual Data Base, Design with ER Model-Entity vs Attribute, Entity vs Relationship Binary vs Ternary Relationship and Aggregation vs ternary Relationship Conceptual Design for a Large Enterprise.
III	RELATIONSHIP ALGEBRA AND CALCULUS: Relationship Algebra Selection and Projection, Set Operations, Renaming, Joints, Division, Relation Calculus, Expressive Power of Algebra and Calculus.
IV	SQL QUERIES PROGRAMMING AND TRIGGERS: The Forms of a Basic SQL Query, Union, Intersection and Except, Nested Queries ,Correlated Nested Queries, Set-Comparison Operations, Aggregate Operators, Null Values and Embedded SQL, Dynamic SQL, ODBC and JDBC, Triggers and Active Databases.
V	SCHEMA REFINEMENT AND NORMAL FORMS: Introductions to Schema Refinement, Functional Dependencies, Boyce-Cod d Normal Forms, Third Normal Form, Normalization-Decomposition into BCNF Decomposition into 3-NF.

Reference Books

1. Raghu Rama Krishan- Database Management System, Tata McGraw-Hill.
2. Korath H., Silberschatz A. : Database system Concepts, Second Edn., McGraw-Hill, 1991.
3. Majumdar A. K., Bhattacharya P.: Database Management Systems; Tata McGraw-Hill, 1996.
4.Amit Gupta, Database Management System,S.K.Kataria & Sons.
5. Bipin C. Desai, "An introduction to Database Systems", Galgotia Publications.

COMPUTER ARCHITECTURE

Course/Paper:05BIT-104

BIT Semester V

UNIT	CONTENT
I	REGISTER TRANSFER LANGUAGE: Data movement around registers. Data movement from/to memory, arithmetic and logic micro operations. Concept of bus and timing in register transfer.
II	CPU ORGANISATION: Addressing Modes, Instruction Format. CPU organization with large registers, stacks and handling of interrupts & subroutines Instruction pipelining
III	ARITHMETIC ALGORITHM: Array multiplier, Booth's algorithm. Addition subtraction for signed unsigned numbers and 2's complement numbers.
IV	MICROPROGRAMMED CONTROL UNIT : Basic organization of micro-programmed controller, Horizontal & Vertical formats, Address sequencer
V	MEMORY ORGANISATION: Concept of RAM/ROM, basic cell of RAM, Associative memory, Cache memory organization, Vertical memory organization. I/O ORGANISATION: Introduction to Peripherals & their interfacing. Strobe based and handshake-based communication, DMA based data transfer, I/O processor.

Reference Books

1. Hawang, K., Briggs, F. A.: Computer Architecture and Parallel Processing, McGraw Hill, 1985.
2. Hayes- Avanced Computer Architecture, Tata McGraw Hill.
3. M.Morris Mano- Computer Architecture Prentice Hall of India.
4. Structured Computer Organization, Tannenbaum ,PHI.
5. Computer Organization, Stallings , PHI

TELECOMMUNICATION FUNDAMENTAL

Course/Paper: 05BIT-105

BIT Semester V

UNIT	CONTENT
I	Data Transmission: terminology frequency spectrum bandwidth analog and digital transmission. Transmission impairment channel capacity sampling theorem and Fourier series. Transmission media: transmission of signal through twisted pair, coaxial cable, optical fiber,(SM, MM, Graded Index) Wireless Transmission: Antenna and antenna gain, introduction to terrestrial and satellite microwave, propagation of wireless signal free space loss LOS communication. Review of line coding: Concept of bit period, effect of clock skew, synchronous and asynchronous communication Network reference model(OSI /ISO,TCP/IP)
II	Data link layer: Function performed by data link layer data link layer design issue Error control coding: Error detection ,Two dimensional parity checks, Internet checksum, polynomial codes error detecting capability of polynomial codes, linear code, performance of linear code Flow control: Flow control in lossless and lossy channel using stop and wait, sliding window protocol, performance of protocol used for flow control.
III	Data link control: HDLC and PPP including frame structure MAC sub layer Pure and Slotted aloha CSMA,CSMA/CD, collision free multiple access, throughput analysis of pure and slotted aloha, delay and throughput analysis of CSMA and CSMA/CD.
IV	Multiplexing: frequency division and time division(synchronous and statistical) multiplexing,ADSL,DSS1 and DSS3 carrier Multiple access: performance of FDMA-FM-FDMA single channel per carrier, TDMA frame structure, TDMA burst structure, TDMA frame efficiency, TDMA super frame structure, frame acquisition and synchronization, slip rate in digital terrestrial network Switching: Qualitative description of space division, time division and space time and space division switching.

V	Spread spectrum technique: direct sequence(DSSS)&Frequency hoping(FHSS);Performance consideration in DSSS&FHSS; code division multiple access CDMA: frequency and channel specification, Forward and reverse CDMA channel, pseudo noise(PN)sequence, m-sequence, gold sequence, Walsh code Synchronization, power control , handoff, capacity of CDMA system, IMT-2000, WCDM.

Reference Books

1. R. S. Pressman, Software Engineering: A Practitioners Approach, TMH.
2. Carlo Ghezzi, M. Jarayeri, D. Manodrioli, Fundamentals of Software Engineering, PHI.
3. Pankaj Jalote, Software Engineering, Narosa Publication.

ADVANCED DATA STRUCTURES

Course/Paper: 05BIT-106.1

BIT Semester V

UNIT	CONTENT
I	ADVANCED TREES: Definitions Operations on Weight Balanced Trees (Huffman Trees), 2-3 Trees and Red-Black Trees. Augmenting Red-Black Trees to Dynamic Order Statistics and Interval Tree Applications. Operations on Disjoint sets and its union-find problem Implementing Sets. Dictionaries, Priority Queues and Concat enable Queues using 2-3 Trees.
II	MERGEABLE HEAPS: Mergeable Heap Operations, Binomial Trees Implementing Binomial Heaps and its Operations, 2-3-4. Trees and 2-3-4 Heaps. Amortization analysis and Potential Function of Fibonacci Heap Implementing Fibonacci Heap. SORTING NETWORK: Comparison network, zero-one principle, bitonic sorting and merging network sorter.
III	GRAPH THEORY DEFINITIONS: Definitions of Isomorphic Components. Circuits, Fundamental Circuits, Cut-sets. Cut-Vertices Planer and Dual graphs, Spanning Trees, Kuratovski's two Graphs.
IV	GRAPH THEORY ALGORITHMS: Algorithms for Connectedness, Finding all Spanning Trees in a Weighted Graph and Planarity Testing, Breadth First and Depth First Search, Topological Sort, Strongly Connected Components and Articulation Point. Single Min-Cut Max-Flow theorem of Network Flows. Ford-Fulkerson Max Flow Algorithms
V	NUMBER THEORITIC ALGORITHM: Number theoretic notation, Division theorem, GCD recursion, Modular arithmetic, Solving Linear equation, Chinese remainder theorem, power of an element, RSA public key Crypto system, primality Testing and Integer Factorization.

Reference Books

1. AhoA.V.,J.E.Hopcroft,J.D.Ullman,Design and Analysis of Algorithms,Pearson Education
2. Rivest and Corman,Introduction to Algorithms, Prectice Hall of India
3. Baase,Computer Algorithms Prectice Hall
4. Horowitz & Sahani, "Fundamental of Computer Algorithm", Galgotia.

SIMULATION AND MODELING

Course/Paper:05BIT-106.2

BIT Semester V

UNIT	CONTENT
I	System definition and components, Stochastic activities, continuous and discrete systems, System modeling, types of models, static and dynamic physical models, static and dynamic mathematical models, full corporate model, types of system study.
II	System simulation, why to simulate and when to simulate, basic nature of simulation, technique of simulation, comparison of simulation and analytical methods, types of system simulation, real time simulation, hybrid simulation, simulation of pure-pursuit problem single-server queuing system and an inventory problem, Monte- Carlo simulation, Distributed Lag models, Cobweb model.

UNIT	
III	Simulation of continuous systems, analog vs. digital simulation, simulation of water reservoir system, simulation of servo system, simulation of an autopilot. Discrete system simulation, fixed time-step vs. event-to-event model, generation of random numbers, test of randomness, generalization of non-uniformly distributed random numbers, Monte-Carlo computation vs. stochastic simulation.
IV	System Dynamics, exponential growth models, exponential decay models, modified exponential growth models ,logistic curves, generalization of growth models, system dynamics diagrams, feedback in socio-economic systems and world models.
V	Simulation of PERT networks, critical path simulation, uncertainties in activity duration, resource allocation and consideration .Simulation software, simulation languages, continuous and discrete simulation languages, expression based languages, object-oriented simulation, general-purpose vs. application-oriented simulation packages, CSMP-III and MODSIM-III.

Reference Books

1. Gorden G., System simulation, Printice Hall.
2. Payer T., Introduction to system simulation, McGraw Hill.
3. spuet, Computer Aided Modeling and Simulation, W.I.A.
4. Sushil, System Dynamics, Wiley Eastern Ltd.
5. Shannon R.E., System simulation, Prentice Hall.
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IT FOR FORENSIC SCIENCES

Course/Paper:05BIT-106.3

BIT Semester V

UNIT	CONTENT
I	Overview of Biometrics, Biometric Identification, Biometric Verification, Biometric Enrollment, Biometric, System Security .Authentication and Biometrics: Secure Authentication Protocols, Access Control Security Services, Authentication Methods, Authentication Protocols, Matching Biometric Samples, Verification by humans .Common biometrics: Finger Print Recognition, Face Recognition, Speaker Recognition, Iris Recognition, Hand Geometry, Signature Verification, Positive and Negative of Biometrics. Matching: Two kinds of errors, Score distribution, Estimating Errors from Data, Error Rate of Match Engines, Definition of FAR and FRR.
II	Introduction to Information Hiding: Technical Stegano graphy, Linguistic Stegano graphy, Copy Right Enforcement ,Wisdom from Cryptography Principles of Steganography: Framework for Secret Communication, Security of Stegano graphy System, Information Hiding in Noisy Data , Adaptive versus non-Adaptive Algorithms, Active and Malicious Attackers, Information hiding in Written Text.
III	A Survey of Steganographic Techniques: Substitution systems and Bit Plane Tools, Transform Domain Techniques: - Spread Spectrum and Information hiding, Statistical Steganography, Distortion Techniques, Cover Generation Techniques. Steganalysis: Looking for Signatures: - Extracting hidden Information, Disabling Hidden Information.
IV	Watermarking and Copyright Protection: Basic Watermarking, Watermarking Applications, Requirements and Algorithmic Design Issues, Evaluation and Benchmarking of Watermarking system.

Reference Books

1. Katzendbisser, Petitcolas, " Information Hiding Techniques for Steganography and Digital
Watermarking", Artech House.
2. Peter Wayner, "Disappearing Cryptography: Information Hiding, Steganography and
Watermarking 2/e", Elsevier
3. Bolle, Connell et. al., "Guide to Biometrics", Sp ringer

Laboratories: V Semester

OPERATING SYSTEMS LAB

Course/Paper:05BIT-201
BIT Semester V

Objectives:

1. Understand the basic function of operating system.

2. In depth knowledge of the algorithms used for implementing the task performed by operating system.

3. Understand & simulate strategies used in Linux & windows operating system.

4. Develop aptitude for carrying out research in the area of operating system.

E-COMMERCE LAB

Course/Paper:05BIT-202
BIT Semester V

1. Overview of Lab & Project.

2. Basics of HTML, DHTML, ASP and ASP data Connectivity.

3. Creation of the SQL server Database.

4. Creation of the ODBC connectivity.

5. Insertion/ modification of data with ASP.

6. Selection of data using Record sets.

7. Exercises using ASP/SQL

8. Exercises using MS FrontPage.

Mini Project in E-Commerce: Developing a small E-Commerce product catalog using ASP/SQL.

DATABASE LAB

Course/Paper:05BIT-203
BIT Semester V

Student can use MySql (preferred open source DBMS) or any other Commercial DBMS tool (MS-Access / ORACLE) at backend and C++ (preferred) VB/JAVA at front end.

1. (a) Write a C++ program to store students records (roll no, name, father name) of a class using file   handling.(Use C++ and File handling).

   (b) Re-write program 1, using any DBMS and any compatible language.(C++/MySQL) (VB and MS-Access)

2.   Database creation/ deletion, table creation/ deletion.

 (a) Write a program to take a string as input from user. Create a database of same name. Now ask user to   input two more string, create two tables of these names in above database.

   (b) Write a program, which ask user to enter database name and table name to delete. If database exist and table exist then delete that table.

3. Write a program, which ask user to enter a valid SQL query and display the result of that query.

4. Write a program in C++ to parse the user entered query and check the validity of query.

(Only SELECT query with WHERE clause)

5 - 6. Create a database db1, having two tables t1 (id, name, age) and t2 (id, subject, marks).

(a) Write a query to display name and age of given id (id should be asked as input).

(b) Write a query to display average age of all students.

(c) Write a query to display mark-sheet of any student (whose id is given as input).

(d) Display list of all students sorted by the total marks in all subjects.

7 - 8. Design a Loan Approval and Repayment System to handle Customer's Application for Loan and handle loan repayments by depositing installments and reducing balances.

9 -10. Design a Video Library Management System for managing issue and return of Video tapes/CD and manage customer's queries.

DIGITAL HARDWARE DESIGN LAB

Course/Paper:05BIT-204
BIT Semester V

Objectives: At the end of course, the students shall be able to

1. Should be able to design data path for digital system.
2. Create a digital system using discrete digital ICs.
3. Design a hard wired / micro-programmed control circuit.
4. Simulate a digital data path in Hardware Description Language.
5. Understand IC descriptions and select proper IC in a given circuit based on its timing characteristics.

Theory: VI Semester

THEORY OF COMPUTER

Course/Paper:06BIT-101
BIT Semester -VI

UNIT	CONTENT
I	Finite automata &Regular Expression: basic concept of finite state system, Deterministic and non deterministic finite automation and designing regular expressions, relationship between regular expression & Finite automata minimization of finite automation mealy & Moore machines.
II	Regular sets of regular grammars: Basic definition of formal language and grammars , Regular set and regular grammars, closure proportion of regular sets, pumping lemma for regular sets, decision algorithm for regular sets, myhell-Nerod theory & organization of finite automata
III	Context free languages& pushdown automata: context free grammars – derivations and languages- Relationship between derivation and derivation trees ambiguity – simplification of CEG – greiback normal form- chomasky normal forms- problem related to CNF & GNF pushdown automata : definition- moves- instantaneous description – deterministic pushdown automata- pushdown automata and CFL- pumping lemma for CFL- application of pumping lemma .
IV	Turing machines: Turing machines- computable languages and function – Turing machine construction – storage in finite control – multiple tracks- checking symbol – subroutines two way infinite tape. Undecidability : properties of recursive and recursively enumerable language – universal Turing machines as an decidable problem – universal language – rice's theorems.
V	Linear bounded automata context sensitive language: Chomsky hierarchy of language and automata, basic definition and description of theory & organization of linear bounded automata properties of context sensitivity languages

Reference Books

1. Aho, hopcropt and ulman , introduction to automata theory, formal languages and computation, Narosa
2. Cohen introduction to computer theory, addition wesley
3. Papadimitriou, introduction to theory of computer, prentice hall
.

COMPUTER NETWORKS

Course/Paper:06BIT-102
BIT Semester -VI

UNIT	CONTENT
I	Network, Network Protocols, Edge, Access Networks and Physical Media, Protocol Layers and their services models, Internet Backbones, NAP's and ISPs.
II	Application Layer: Protocol and Service Provided by application layer, transport protocols. The world wide web. HTTP, Message formats, User Server Interaction and Web caches. FTP commands and replies. Electronic Mail, SMTP, Mail Message Formats and MIME and Mail Access Protocols DNS The internet's directory service DNS records and Message.
III	Transport Layer: Transport Layer Service and Principles, Multiplexing and Demultiplexing applications, connectionless Transport. UDP Segment structure and UDP Checksum. Principles of Reliable Data Transfer-Go back to N and Selective Repeat. Connection Oriented Transport TCP Connection and Segment Structure, Sequence Numbers and acknowledgement numbers, Telnet, Round trip time and timeout. TCP connection management.
IV	Network Layer and Routing: Network service model, Routing principles. Link State routing Algorithm, A distant Vector routing & OSPF algorithm. Router Components; Input Prot, Switching fabric and output port. IPV6 Packet format. Point To Point Protocol (PPP), transition States, PPP Layers-Physical Layer and Data Link Layer, Link Control Protocols. LCP Packets and options. Authentication PAP and CHAP, Network Control Protocol (NCP).
V	Sonet/SDH:Synchronous Transport Signals. Physical configuration-SONET Devices, Sections, Lines and Paths. SONET Layers-Photonic Layer, section layer, line layer, path layer and device layer relationship. Sonnet Frameformat. Section overhead, Line overhead and path overhead. Virtual Tributaries and types of VTs.

Reference Books

1. Andrew S. Tanenbaum, Computer Networks, Prentice Hall .
2. Behrouz A forouzan, TCP/IP, Tata Mc Graw Hill Pub. Co.
3. DE Corner and DL Stevens, Internet working with TCP/IP Volume I-III, Prentice Hall of India.
4. Computer Networks ,Sanjay Sharma ,S.K Kataria & Sons.
5. Computer Networks ,J.S Rana ,S.K Kataria & Sons.

DESIGN & ANALYSIS OF ALGORITHMS

Course/Paper:06BIT-103
BIT Semester -VI

UNIT	CONTENT
I	BACKGROUND: Review of Algorithm Complexity and Order Notations and Sorting Methods. DIVIDE AND CONQUER METHOD: Binary Search, Merge Sort, Quick sort and strassen's matrix multiplication algorithms. GREEDY METHOD: Knapsack Problem, Job Sequencing, Optimal Merge Patterns and Minimal Spanning Trees.
II	DYNAMIC PROGRAMMING: Matrix Chain Multiplication. Longest Common Subsequence and 0/1 Knapsack Problem. BRANCH AND BOUND: Traveling Salesman Problem and Lower Bound Theory. Backtracking Algorithms and queens problem.
III	PATTERN MATCHING ALGORITHMS: Naïve and Rabin Karp string matching algorithms, KMP Matcher and Boyer Moore Algorithms. ASSIGNMENT PROBLEMS: Formulation of Assignment and Quadratic Assignment Problem.
IV	RANDOMIZED ALGORITHMS. Las Vegas algorithms, Monte Carlo algorithms, randomized algorithm for Min-randomized algorithm for 2-SAT. Problem definition of Multicommodity flow, Flow shop scheduling and Network capacity assignment problems.
V	PROBLEM CLASSES NP, NP-HARD AND NP-COMPLETE: Definitions of P, NP-Hard and NP-Complete Problems. Decision Problems. Cook's Theorem. Proving NP-Complete Problems - Satisfiability problem and Vertex Cover Problem. Approximation Algorithms for Vertex Cover and Set Cover Problem.

Reference Books

1. Aho,A. V. Hopcroft, JE., Ullman. J.D. : The Design and analysis of Computer Algorithms, AddisoIl Wesley Publishing Co., 1974.
2. Horowtiz, E., Sahni,S. : Fundamenta1s of Computer Algorithms, Galgotia Publication, 1984.
3. Goodman, S.E. & Hedetniehi, : Introduction to the Design and Analysis of Algorithms, McGraw-Hill Book Compo J977.
4. Rivest and Corman,Introduction to Algorithms, Prectice Hall of India.
5. Baase,Computer Algorithms Prectice Hall.

INFORMATION THEORY AND CODING

Course/Paper:06BIT-104
BIT Semester -VI

UNIT	CONTENT
I	Introduction to information theory. Uncertainty, Information and Entropy, Information measures for continuous random variables, source coding theorem.. Discrete Memory less channels, Mutual information, Conditional entropy.
II	Source coding schemes for data compaction: Prefix code, Huffman code, Shanon-Fane code & Hempel-Ziv coding channel capacity, Channel coding theorem. Shannon limit.

III	Linear Block Code: Introduction to error connecting codes, coding & decoding of linear block code, minimum distance consideration, conversion of non systematic form of matrices into systematic form.
IV	Cyclic Code: Code Algebra, Basic properties of Galois fields (GF) polynomial operations over Galios fields, generating cyclic code by generating polynomial, parity check polynomial. Encoder & decoder for cyclic codes.
V	Convolutional Code: Convolutional encoders of different rates. Code Tree, Trllis and state diagram. Maximum likelihood decoding of convolutional code: The viterbi Algorithm fee distance of a convolutional code.

PROGRAMMING IN JAVA

Course/Paper:06BIT-105
BIT Semester -VI

UNIT	CONTENT
I	JAVA: introduction to object oriented programming, abstraction, object oriented programming language principles, features of java, introduction to java byte code, java virtual machine PROGRAM ELEMENTS: primitive data types, variables, assignment, arithmetic, short circuit logical operator, arithmetic operators, bitwise operators, relational operators, Boolean logic operators, the assignment operators, operator precedence, Decision and control statements, arrays.
II	CONTROL STATEMENTS: java's selection statements, if statements, switch statements, Iteration statements, while, do-while, for, for-each, nested loops, jump statements, using continue, return. OBJECT AND CLASSES: objects, constructor, returning and passing objects as parameter, nested and inner classes, single and multilevel inheritance, extended classes, access control, usage of super, overloading and overriding methods, Abstract classes, using final with inheritance.
III	PACKAGE AND INTERFACES: defining package, concept of CLASSPATH, access modifiers, importing package, defining and implanting interfaces. STRING HANDLING: string constructors, special string operations, character extraction, searching and comparing strings, string buffer class.
IV	Exception handling fundamentals, exception types, uncaught exception, try, catch and multiple catch statements. Usages of throw, throws and finally FILE HANDLING: I/O streams, File I/O.
V	CONCURRENCY: processes and threads, thread objects, defining and staring a thread, pausing execution with sleep, interrupts, join, Synchronization. APPLET: applet fundamentals, using paint method and drawing polygons.

Reference Books

1.Herbert schildit: JAVA2-the complete reference,TMH,Delhi
2. deitel: how to program JAVA PHI
3. U.K. chakraborty and D.G.dastidar: software and syatems-AN introduction,Wheeler publishing,delhi
4. joseph o'Neil and herb schildit: tech yourself JAVA,TMH,Delhi

DISTRIBUTED PROCESSING

Course/Paper:06BIT-106.1
BIT Semester -VI

UNIT	CONTENT
I	CHARACTERIZATION OF DISTRIBUTED SYSTEMS: Introduction, Examples of distributed Systems, Resource sharing and the Web Challenges. System Models: Architectural models, Fundamental Models Theoretical Foundation for Distributed System: Limitation of Distributed system, absence of global clock, shared memory, Logical clocks, Lamport's & vectors logical clocks, Causal ordering of messages, global state, termination detection. Distributed Mutual Exclusion: Classification of distributed mutual exclusion, requirement of mutual exclusion theorem, Token based and non token based algorithms, performance metric for distributed mutual exclusion algorithms.

II	DISTRIBUTED DEADLOCK DETECTION: system model, resource Vs communication deadlocks, deadlock prevention, avoidance, detection & resolution, centralized dead lock detection, distributed dead lock detection, path pushing algorithms, edge chasing algorithms. Agreement Protocols: Introduction, System models, classification of Agreement Problem, Byzantine agreement problem, Consensus problem, Interactive consistency Problem, Solution to Byzantine Agreement problem, Application of Agreement problem, Atomic Commit in Distributed Database system.
III	DISTRIBUTED OBJECTS AND REMOTE INVOCATION: Communication between distributed objects, Remote procedure call, Events and notifications, Java RMI case study. SECURITY: Overview of security techniques, Cryptographic algorithms, Digital signatures Cryptography pragmatics, Case studies: Needham Schroeder, Kerberos, SSL & Millicent. DISTRIBUTED FILE SYSTEMS: File service architecture, Sun Network File System, The Andrew File System, Recent advances.
IV	TRANSACTIONS AND CONCURRENCY CONTROL: Transactions, Nested transactions, Locks, Optimistic Concurrency control, Timestamp ordering, Comparison of methods for concurrency control. DISTRIBUTED TRANSACTIONS: Flat and nested distributed transactions, Atomic Commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery. Replication: System model and group communication, Fault - tolerant services, highly available services, Transactions with replicated data.
V	DISTRIBUTED ALGORITHMS: Introduction to communication protocols, Balanced sliding window protocol, Routing algorithms, Destination based routing, APP problem, Deadlock free Packet switching, Introduction to Wave & traversal algorithms, Election algorithm. CORBA CASE STUDY: CORBA RMI, CORBA services.

Reference Books

1. Singhal & Shivaratri, "Advanced Concept in Operating Systems", McGraw Hill
2. Coulouris, Dollimore, Kindberg, "Distributed System: Concepts and Design", Pearson Ed.
3. Gerald Tel, "Distributed Algorithms", Cambridge University Press

ADVANCED COMPUTER ARCHITECTURES
Course/Paper:06BIT-106.2
BIT Semester -VI

UNIT	CONTENT
I	INTRODUCTION: Parallel Computing, Parallel Computer Model, Program and Network Properties, Parallel Architectural Classification Schemes, Flynn's & Feng's Classification, Performance Metrics and Measures, Speedup Performance Laws: Multiprocessor System and Interconnection Networks; IEEE POSIX Threads: Creating and Exiting Threads, Simultaneous Execution of Threads, Thread Synchronization using Semaphore and Mutex, Canceling the Threads.
II	PIPELINING AND MEMORY HIERARCHY: Basic and Intermediate Concepts, Instruction Set Principle; ILP: Basics, Exploiting ILP, Limits on ILP; Linear and Nonlinear Pipeline Processors; Super Scalar and Super Pipeline Design; Memory Hierarchy Design: Advanced Optimization of Cache Performance, Memory Technology and Optimization, Cache Coherence and Synchronization Mechanisms.
III	THREAD AND PROCESS LEVEL PARALLEL ARCHITECTURE: Introduction to MIMD Architecture, Multithreaded Architectures, Distributed Memory MIMD Architectures, Shared Memory MIMD Architecture, Clustering, Instruction Level Data Parallel Architecture, SIMD Architecture, Fine Grained and Coarse Grained SIMD Architecture, Associative and Neural Architecture, Data Parallel Pipelined and Systolic Architectures, Vector Architectures.
IV	Parallel Algorithms: PRAM Algorithms: Parallel Reduction, Prefix Sums, Preorder Tree Traversal, Merging two Sorted lists; Matrix Multiplication: Row Column Oriented Algorithms, Block Oriented Algorithms; Parallel Quicksort, Hyper Quick sort; Solving Linear Systems: Gaussian Elimination, Jacobi Algorithm; Parallel Algorithm Design Strategies.
V	Developing Parallel Computing Applications: OpenMP Implementation in 'C': Execution Model, Memory Model; Directives: Conditional Compilation, Internal Control Variables, Parallel Construct, Work Sharing Constructs, Combined Parallel Work-Sharing Constructs, Master and Synchronization Constructs; Run-Time Library Routines: Execution Environment Routines, Lock Routines, Timing Routines; Simple Examples in 'C'. Basics of MPI.

Reference Books

1. J.P. Hayaes "Computer Architecture", McGraw-Hill.
2. Stalling W., "Computer Organization & Architecture", PHI.
3. V. Rajaranam & C.S.R. Murthty "Parallel Computers", PHI.
4. Advanced Computer Architecture,Amit Kumar Mishra S.K. Kataria & Sons.
5. Kia Hwang ,Advanced computer Architecture Tata McGraw-Hill.

HUMAN COMPUTER INTERFACE

Course/Paper:06BIT-106.3
BIT Semester -VI

UNIT	CONTENT
I	The human: input-output channels, human memory, thinking, emotion, individual differences, psychology and the design of interactive system The computer: Text entry devices with focus on the design of key board, Positioning, pointing and drawing, display devices. The interaction : models of interaction, ergonomics, interaction style, elements of WIMP interfaces, interactivity, experiences,, engagement and fun. Paradigms for interaction.
II	Design process: the process of design, user focus, scenarios, navigation design screen design and layout, iteration & prototyping Usability engineering Design rules: principle to support usability, standard, guidelines, rules and heuristics, HCI pattern.
III	Evaluation technique: Definition and goals of evaluation through expert analysis and user participation, choosing an evaluation method. User support, requirement, approaches, adaptive help system, designing user support system.
IV	Congnitive methods: goals and task hierarchies, linguistic models, challenges of display based system, physical and device models, congnitive architectures.
V	Communication and collaboration models: face t o face communication, conversation, text based communication, group working. Task analysis: Differences between task analysis and other technique, task decomposition, knowledge based analysis. ER based analysis, sources of information and data collection ,use of task analysis

Reference Books

1. Human computer interaction: Alan dix et.al ,3rd ed., person

Laboratories: VI Semester

SHELL PROGRAMMING LAB

Course/Paper:06BIT-201
BIT Semester -VI

1. Practice commands: cp, mv, rm, ln, ls, who, echo, cat, mkdir, rmdir. Wildcards (?, *) , I/O redirection (<, >, >>),

pipelines (|)

2. Practice commands: xargs, alias, set-unset, setenv-unsetenv, export, source, ps, job, kill.

3. Practice commands: head, tail, cut, paste, sed, grep, sort, uniq, find , locate, chmod.

4. Writing a simple shell script to echo who is logged in.

5. Write a shell script to display only executable files in a given directory.

6. Write a shell script to sort a list of file either in alphabetic order or largest file first according to user response.

7. Write a shell script to count the lines. Words and characters in its input (Note : Don't use wc).

8. Write a shell script to print end of a glossary file in reverse order using array. (Hint: use awk tail).

9. Modify cal command to accept more than one month (e.g. $cal Oct, Nov,)(Hint : use alias too)

10. Write a shell script to check whether Ram logged in, continue checking every 60 seconds until success.

Course/Paper:06BIT-202
BIT Semester -VI

1. Adding buttons, edit fields, and other child-window components

2. Implement the C Object debugging ability and Common MFC problems

3. Implement GDI Functions, and the CDC class (Text, Drawing shapes, Bitmaps)

4. Implementing View class functions

     I.   Interacting with the user

     II.   Event Handling

     III.   Responding to events from different control types.

5.   Implementing View class functions

     I.   GDI Functions and the CDC class

     II.   Text

     III. Drawing shapes

     IV.   Bitmaps

6. Implementing Dialog Block class

    Creating a Dialog box

    Invoking and displaying

    Setting and retrieving values from a Dialog box

7. Implementing Dialog Boxes, Completion Database classes

     I.   ODBC vs. DAO

     II.   Databases and Record sets

     III. Queries (filtering and ordering)

8. Printing and Print Preview

     I.   Database-style reports

     II.   Common Dialog interface

DESIGN AND ANALYSIS OF ALGORITHMS

Course/Paper:06BIT-203
BIT Semester -VI

Programming assignments on each algorithmic strategy:

• Divide and conquer method (quick sort, merge sort, Strassen's matrix multiplication),

• Greedy method (knapsack problem, job sequencing, optimal merge patterns, minimal spanning trees).

• Dynamic programming (multistage graphs, OBST, 0/1 knapsack, traveling salesperson problem).

• Back tracking (n-queens problem, graph coloring problem, Hamiltonian cycles).

• Sorting: Insertion sort, Heap sort, Bubble sort

• Searching: Sequential and Binary Search

• Selection: Minimum/ Maximum, Kth smallest element.

JAVA PROGRAMMING LAB

Course/Paper:06BIT-204
BIT Semester -VI

Objectives: At the end of the semester, the student s should have clearly understood and implemented the following:

1. Develop an in depth understanding of programming in java: data types, variables, Operators, operator precedence, decision and control statements, arrays, switch statement, iteration statements, jump statements, using break, using continue return.

2. Write object oriented programs in java: objects, classes constructors, returning and passing objects as parameter, inheritance, access control, using super, final with inheritance overloading and overriding methods, abstract classes, extended Classes.

3. Develop understanding to developing packages & interfaces in java: package, Concept of CLASSPATH, access modifiers, importing package, defining and implementing interfaces.

4. Develop understanding to developing string and exception handling: string constructors, special string operation, character extraction, searching and comparing strings, string buffer class. Exception handling fundamentals, Exception types, uncaught exceptions, try, catch and multiple catch statements. Usage of throw, throws and finally.

5. Develop applications involving handling: I/O streams, File I/O.

6. Develop applications involving concurrency: processes and threads, thread objects, defining and starting a thread, pausing execution with sleep, interrupts, joins, and Synchronization

7. Develop applications involving applet: Applet fundamentals, using paint method and drawing polygons.

Theory: VII Semester

WEB TECHNOLOGY

Course/Paper:07BIT-101
BIT Semester -VII

UNIT	CONTENT
I	Introduction, Editing XHTML, First XHTML Example , W3C XHTML Validation service , Headings, Linking, Images, Special Characters and horizontal rules, Lists, Tables, forms, Internet linking, web resources. Cascading Style Sheets Introduction , Inline Styles, Embedded Style Sheets, Conflicting Styles , Linking External Style Sheets, Positioning Elements , Backgrounds , Element Dimensions , Box Model and Text Flow Media types, Building a CSS drop-down menu, User Style Sheet s ,CSS3, Web Resources.
II	JavaScript: Introduction to Scripting, Control Structures, Functions, Arrays, Objects, and Document object model (DOM): Objects and Collections, Events. XML and RSS: Introduction, XML basics, structuring data, XML namespaces, document type definitions (DTDs), W3C XML schema documents ,XML vocabularies, Extensible style sheet language and XSL transformations, Document object model(DOM),RSS
III	Ajax-enabled rich internet applications: introduction , traditional web applications vs Ajax application , rich internet application (RIAs)with Ajax, history of Ajax, "Raw" Ajax example using the XMLHttpRequest object , us ing XML and the DOM, creating a full-scale Ajax –enabled application ,dojo toolkit Web Servers (IIS and Apache): introduction, HTTP transactions , multi tier application architecture ,client-side scripting versus server-side scripting ,accessing web servers, Microsoft internet information services(IIS), Apache HTTP server, requesting documents
IV	PHP: Introduction, PHP basics, string processors and regular expressions , form processing and business logic, connecting to a database, using cookies, dynamic content, operator precedence chart ASP.NET 2.0 and ASP.NET Ajax: introduction, creating and running a simple web form example, web controls, session tracking. Case study : connecting to a database in ASP.NET
V	Java Server Faces Web applications: introduction, java web technologies, creating and running a simple application in NetBeans, JSF components , ses sion tracking.

Reference Books

1. Internet & WWW, How to program, DEITEL P.J., H.M., Prentice Hall

COMPUTER GRAPHICS

Course/Paper:07BIT-102
BIT Semester -VII

UNIT	CONTENT
I	Introduction to Raster scan displays, Storage tube displays, refreshing, flicking, interlacing, color monitors, display processors resolution, working principle of dot matrix, inkjet laser printers, working principles of keyboard, mouse scanner, digitizing camera, track ball , tablets and joysticks, graphical input techniques, positioning techniques, rubber band techniques, dragging etc.
II	Scan conversion techniques, image representation, line drawing, simple DDA, Bresenham's Algorithm, Circle drawing, general method, symmetric DDA, Bresenham's Algorithm, curves, parametric function, Beizier Method, B-sp-line Method.
III	2D & 3D Co-ordinate system, Translation, Rotation, Scaling, Reflection Inverse transformation, Composite transformation, world coordinate system, screen coordinate system, parallel and perspective projection, Representation of 3D object on 2D screen.
IV	Point Clipping. Line Clipping Algorithms, Polygon Clipping algorithms, Introduction to Hidden Surface elimination, Basic illumination model, diffuse reflection, specular reflection, phong shading, Gourand shading ray tracing, color models like RGB, YIQ, CMY, HSV etc.
V	Multimedia components, Multimedia Hardware, SCSI, IDE, MCI, Multimedia data and file formats, RTF, TIFF, MIDI, JPEG, DIB, MPEG, Multimedia Tools, Presentation tools, Authoring tools, presentation.

Reference Books

1. Hearn D., Baker P.M.: Computer Graphics, PHL, 1986.
2. Giloi, W.K.:Interactive Computer Graphics,Prentice-Hall.
3. Mewman, W. Sproul R.F.:Principles of Interactive Computer Graphics,McGraw-Hill.1980.
4. Computer Graphics,V.K. Panchghare,Laxmi Publication.
5. Computer Graphic,Udit Agarwal,S.K.Kataria & Sons.

DATA MINING AND WAREHOUSING

Course/Paper:07BIT-103
BIT Semester -VII

UNIT	CONTENT
I	Overview, motivation (for mining), data mining – definition and functionalities, data processing and its forms, data cleaning: missing values , noisy data (binning , clustering , regression , computer and human inspection) , inconsistent data , data integration and transformation . Data reduction; - data cube aggregation, dimensionality, reduction, data compression, numerosity reduction, clustering, discretization and concept hierarchy generation.
II	Concept description : definition , data generalization , analytical characterization , analysis of attribute relevance , mining class comparisons , statistical measures in large databases .measuring central tendency , measuring dispersion of data , graph displays of basic statistical class description , mining association rules in large databases , association rule mining , mining single – dimensional Boolean association rules from transactional databases – apriori algorithm , mining multilevel association rules from transaction databases and mining multi – dimensional association rules from relational databases .
III	What is classification and prediction , issues regarding classification and prediction , decision tree , Bayesian classification , classification by back propagation , multi layer feed forward neural network , back propagation algorithm , classification methods K- nearest neighbor classifiers , genetic algorithm . cluster analysis : data types in cluster analysis , categories of clustering methods , partitioning methods. hierarchical clustering – CURE and chameleon . density based methods – DBSCAN, OPTICS. Grid based methods – STRING , CLIQUE . model based methods – statistical approach , neural network approach , outliner analysis
IV	Data warehousing : overview , definition , delivery process , difference between database system and data warehouse , multi dimensional data model , data cubes , stars , snow flakes , fact constellation , concept hierarchy , process architecture , 3- tier architecture , data mining .
V	Aggregation, historical information, query facility, OLAP function and tools OLAP servers ROLAP, MOLAP, HOLAP, data mining interface, security, back up and recovery, tuning data warehouse, testing datawarehouse.

Reference Books

1. ata warehouses in the real world – pearson education
2. data mining – concepts and techniques – jiawai han and micheline kamber .
3. building the data warehouse – wh inmon , wiley .

WIRELESS COMMUNICATION

Course/Paper:07BIT-104
BIT Semester -VII

UNIT	CONTENT
I	Introduction: Cellular revolution, Global Cellular Network, Broad band and troubles with wireless. Principles of Cellular networks, First generation analog Second generation TDMA and Third generation systems.
II	Cordless Systems And Wireless Local Loops: Cordless systems, Wireless local loop and IEEE 802. 16 Fixed Broadband Wireless Access standards. Mobile IP, Wireless Application Protocol, Internet Control Message Protocol and Message Authentication.
III	Satellite Systems: Application Basics-GEO, LEO and MEO Introduction to Mobile Satcom. Routing, Localization and Handover.
IV	Broad Cast Systems: Overview, Cyclic repetition of data, Digital audio broadcasting-mobile object transfer protocol. Digital video broadcasting.
V	Wireless LAN: Infrared vs radio transmission, Infrastructure and ad hoc networks, IEEE 802. 11-System architecture, protocol architecture, Physical layer, Medium access control layer and MAC management. HIPER LAN-protocol architecture, physical layer channel access control sub layer, information bases and networking. Bluetooth-User scenarios, Physical layer, MAC Layer, Networking, Security and Link Management

Reference Books

1.   Reappaport- Wireless Communication, Pearson Education .

2. William Stallings- Wireless Communication& Network,Pearson education, Asia .
3. Richharia M- Sattelite communication, Mac Millan.

SOFTWARE PROJECT MANAGEMENT

Course/Paper:07BIT-105
BIT Semester -VII

UNIT	CONTENT
I	Project Management: The management spectrum, the people, the product, the process, the project, the W5HH principle, critical practices. Metrics for Process and Project: Metrics in the process and project Domains, software measurements, metrics for software quality, integrating metrics within software process, metrics for small organizations, establishing a software metrics program.
II	Estimation: Observations, Project planning Process, software scope and feasibility, resources, software project estimation, decomposition techniques, empirical estimation models, estimation for object oriented projects, estimation for Agile development and web engineering projects, the make/buy decision. Project Scheduling: Basic concepts, project scheduling, defining a task set and task network, scheduling, earned value analysis.
III	Risk Management: Reactive V/S proactive Risk Strategies, software risks, Risk identification, Risk projection, risk refinement, risk mitigation, monitoring and management, the RMMM plan . Quality Planning: Quality Concepts, Procedural Approach to Quality Management, Quantitative Approaches to Quality Management, Quantitative Quality Management Planning, Setting the Quality Goal, Estimating Defects for Other Stages, Quality Process Planning, Defect Prevention Planning.
IV	Quality Management: Quality Concepts, Software Quality assurances, software reviews, formal technical reviews, Formal approaches to SQA, Statistical Software Quality assurances, Change Management: software Configuration Management, The SCM repository, SCM Process, Configuration Management for Web Engineering.
V	Project Execution And Closure: Reviews. The Review Process, Planning, Overview and Preparation, Group Review Meeting, Rework and Follow-up, One-Person Review, Guidelines for Reviews in Projects, Data Collection, Analysis and Control Guidelines, Introduction of Reviews and the NAH Syndrome. Project Monitoring and Control: Project Tracking, Activities Tracking, Defect Tracking, Issues Tracking, Status Reports, Milestone Analysis, Actual Versus Estimated Analysis of Effort and Schedule, Monitoring Quality, Risk-Related Monitoring. Project Closure: Project Closure Analysis, The Role of Closure Analysis, Performing Closure Analysis.

Reference Books

1. R. S. Pressman, Software Engineering
2. Pankaj Jalote, Software project management in practice, Addison-Wesley
3. B. Hughest & M. Cotterell, Software Project Management

SPEECH PROCESSING

Course/Paper:07BIT-106.1
BIT Semester -VII

UNIT	CONTENT
I	The speech chain: current capabilities in synthesis and recognition. Acoustic phonetics. Vocal tract physiology: voiced excitation, unvoiced excitation (bursts, frication). Acoustics of uniform tubes, of two- and three-tube models. Comparison to speech data.
II	Synthesis: Formant synthesis (series, parallel), Articulatory synthesis, Concatenative Synthesis, Text-to-Speech (normalisation, linguistic units, rules). Articulatory parameters, shape-to-sound transformation, vocal tract imaging, revising the acoustic model.
III	Letter-sound relations, phonology; prosody, intelligibility, quality assessment. Ear physiology. Auditory perception. Speech perception.
IV	Recognition: Template matching. (Training, distance measures, dynamic time warping), Stochastic models. (Hidden Markov models, Baum-Welch and Forward-Backward algorithms). Large-Vocabulary Recognition. (Phonemic baseforms, language models), Artificial Neural Networks. (Overview, hybrid systems).
V	Assessing recognition performance; improving recognition performance; Knowledge-based approaches, auditory models.

Reference Books

1. J. R. Deller, J. R. Proakis, J. H. L. Hansen, Discrete-Time Processing of Speech Signals, Prentice-Hall 1993
2. P. B. Denes and E. N. Pinson, The Speech Chain, W. H. Freeman & Co 1993
3. K. N. Stevens, Acoustic Phonetics, MIT
4. J N Holmes and W. Holmes, Speech Synthesis and Recognition, 2nd ed. Taylor and Francis, 2001.

REAL TIME SYSTEMS

Course/Paper:07BIT-106.2
BIT Semester -VII

UNIT	CONTENT
I	Introduction: Definition, Typical Real Time Applications: Digital Control, High Level Controls, Signal Processing etc., Release Times, Deadlines, and Timing Constraints, Hard Real Time Systems and Soft Real Time Systems, Reference Models for Real Time Systems: Processors and Resources, Temporal Parameters of Real Time Workload, Periodic Task Model, Precedence Constraints and Data Dependency.
II	Real Time Scheduling: Common Approaches to Real Time Scheduling: Clock Driven Approach, Weighted Round Robin Approach, Priority Driven Approach, Dynamic Versus Static Systems, Optimality of Effective-Deadline-First (EDF) and Least-Slack-Time-First (LST) Algorithms, Offline Versus Online Scheduling, Scheduling Aperiodic and Sporadic jobs in Priority Driven and Clock Driven Systems.
III	Resources Access Control: Effect of Resource Contention and Resource Access Control (RAC), Non-pre-emptive Critical Sections, Basic Priority-Inheritance and Priority-Ceiling Protocols, Stack Based Priority-Ceiling Protocol, Use of Priority-Ceiling Protocol in Dynamic Priority Systems, Preemption Ceiling Protocol, Access Control in Multiple-Unit Resources, Controlling Concurrent Accesses to Data Objects.
IV	Multiprocessor System Environment: Multiprocessor and Distributed System Model, Multiprocessor Priority-Ceiling Protocol, Schedulability of Fixed-Priority End-to-End Periodic Tasks, Scheduling Algorithms for End-to-End Periodic Tasks, End-to-End Tasks in Heterogeneous Systems, Predictability and Validation of Dynamic Multiprocessor Systems, Scheduling of Tasks with Temporal Distance Constraints.
V	Real Time Communication: Model of Real Time Communication, Priority-Based Service and Weighted Round- Robin Service Disciplines for Switched Networks, Medium Access Control Protocols for Broadcast Networks, Internet and Resource Reservation Protocols, Real Time Protocols, Communication in Multicomputer System, An Overview of Real Time Operating Systems.

Reference Books

1. W.S.Liu-Real time System,Pearson Education Asia Publication
2. Raymond a.buhr-Introduction to Real time System, Pearson Education Asia
3. Alan Burns- Real time System and Programming Languages, Pearson Education.
4. Real-Time Systems: Scheduling, Analysis, and Verification by Prof. Albert M. K.Cheng, John Wiley and Sons Publications.
5. Real Time System, Poonam Singh, Dhanpat Rai.

BIO-INFORMATICS

Course/Paper:07BIT-106.3
BIT Semester -VII

UNIT	CONTENT
I	INTRODUCTION: Bioinformatics objectives and overviews, Interdisciplinary nature of Bioinformatics, Data integration, Data analysis, Major Bioinformatics databases and tools. Metadata: Summary & reference systems, finding new type of data online. MOLECULAR BIOLOGY AND BIOINFORMATICS: Systems approach in biology, Central dogma of molecular biology, problems in molecular approach and the bioinformatics approach, Overview of the bioinformatics applications.
II	THE INFORMATION MOLECULES AND INFORMATION FLOW: Basic chemistry of nucleic acids, Structure of DNA, Structure of RNA, DNA Replication, -Transcription, -Translation, Genes- the functional elements in DNA, Analyzing DNA,DNA sequencing. Proteins: Amino acids, Protein structure, Secondary, Tertiary and Quaternary structure, Protein folding and function, Nucleic acid-Protein interaction.
III	PERL: Perl Basics, Perl applications for bioinformatics- Bioperl, Linux Operating System, Understanding and Using Biological Databases, Java clients, CORBA, Introduction to biostatics.
IV	NUCLEOTIDE SEQUENCE DATA: Genome, Genomic sequencing, expressed sequence tags, gene expression, transcription factor binding sites and single nucleotide polymorphism. Computational representations of molecular biological data storage techniques: databases (flat, relational and object oriented), and controlled vocabularies, general

	data retrieval techniques: indices, Boolean search, fuzzy search and neighboring, application to biological data warehouses.
V	BIOLOGICAL DATA TYPES AND THEIR SPECIAL REQUIREMENTS: sequences, macromolecular structures, chemical compounds, generic variability and its connection to clinical data. Representation of patterns and elationships: alignments, regular expressions, hierarchies and graphical models.

Reference Books

1. Bioinformatics, CSV Murthy, Himalya Publishing House
2. Introduction to Bioinformatics, Attwood & Parry Smith, Pearson Education Ltd.
3. Bioinformatics Method and Protocols (Methods in molecular Biology, Clifton N.J.)
4. Developing Bioinformatics Computer skills Cynthia Gibas, Sheroff Publisherand Distributors Pvt. Ltd. Kolkata
5. Introduction to Bio-Informatics, Meetu Maheshwari,S.K. Kataria & Sons

Laboratories: VII Semester

WEB TECHNOLOGY LAB

Course/Paper:07BIT-201
BIT Semester –VII

1 Development of static pages using HTML of an online Departmental Store. The website should be user friendly and should have the following pages:

_ Home page

_ Registration and user login

_ User profile page

_ Items catalog

_ Shopping cart

_ Payment by credit card

_ Order confirmation

2 Add validations to the above static pages of registration, user login, user profile and payment by credit card using Java Script.

3 Creation of a XML document of 20 students of III IT. Add their roll numbers, marks obtained in 5 subjects, total and percentage and save this XML document at the server. Write a program that takes students' roll number as an input and returns the students marks, total and percentage by taking the students' information from the XML document.

4 Creation of a Java Bean which gives the converted value of Temperature (in degree Celsius) into equivalent Fahrenheit.

5 Creation of a simple Bean with a label – which is a "count" of number of clicks. Then create a BeanInfo class such that only the "count" is visible in the Property Window.

6 Creation of two Beans a) Keypad b) Display pad. After that integrate the two beans to make it work as a calculator.

7 Installation of TOMCAT web server. Convert the static web pages of assignments 2 into dynamic web pages using servlets and cookies.

8 Do the assignment 7 using JSP by converting the static web pages of assignment 2 into dynamic web pages. Create database with User Information and Item information. The Item catalog should be dynamically loaded from the database.

9 Implementation of "Hello World!" program using JSP Struts Framework

COMPUTER GRAPHICS LAB

Course/Paper:07BIT-202
BIT Semester -VII

1. Implementation of line generation using slope's method, DDA and Bresenham's algorithms.

2. Implementation of circle generation using Mid-point method and Bresenham's algorithm.

3. Implementation of ellipse generation using Mid-point method.

4. Implementation of polygon filling using Flood-fill, Boundary-fill and Scan-line algorithms.

5. Implementation of 2D transformation: Translation, Scaling, Rotation, Mirror Reflection and Shearing

(write a menu driven program).

6. Implementation of Line Clipping using Cohen-Sutherland algorithm and Bisection Method.

7. Implementation of Polygon Clipping using Sutherland-Hodgman algorithm.

8. Implementation of 3D geometric transformations: Translation, Scalind and rotation.

9. Implementation of Curve generation using Interpolation methods.

10. Implementation of Curve generation using B-spline and Bezier curves.

11. Implementation of any one of Back face removal algorithms such as Depth-Buffer algorithm,

Painter's algorithm, Warnock's algorithm, Scan-line algorithm)

UML LAB

Course/Paper:07BIT-203
BIT Semester -VII

Students are required to prepare various UML diagrams for any case study like Microwave Oven

Following diagrams should be prepared:

1. Use case static structure diagram

2. Object and Class diagram

3. Sequence Diagram

4. Collaboration Diagram

5. State Chart Diagram

6. Activity Diagram

7 - 8. Component Diagram

9 -10. Deployment Diagram

Theory: VIII Semester

SOFTWARE TESTING & VALIDATION

Course/Paper: 08BIT-101
BIT Semester- VIII

UNIT	CONTENT
I	Software Verification and Validation:- Introduction, Verification, method of Verification, Validation, Level of Validation, Principal of testing , Context of testing in Producing software, White Box testing- Definition, static, testing, structural testing, Black box testing.
II	Integration Testing:- Scenario Testing, Defect, bash, System and acceptance testing- functional, non- functional testing, Performance testing- Methodology, tool & process
III	Regression Testing, Internationalization Testing:- Introduction, Test Phase of Internationalization testing, Enabling Testing, Local Testing , Language Testing, Localization Testing , Ah-hoc Testing-Overview, Buddy Testing, Pair Testing, Exploratory Testing, Iterative Testing Agile and Extreme Testing.
IV	Testing Of Object –Oriented system:-Introduction, primer object – oriented software, Differences in OO testing. Usability And Accessibility Testing- What is usability testing, approach to usability, when to do usability testing, how to achieve usability, Quality factors for usability, Accessibility testing, tools for usability.
V	Test Planning, Test Management, Test process and reporting, Software Test, Test Automation-Scope of automation Design and architecture of automation, Process Model for Automation, Test matrices and measurement- Type of metrics, project metrics Productivity metrics, progress metrics, Release metrics.

Reference Books

1. Software testing, Srivinvasan D., Gopalswami R. pearson Education
2. Software Testing M G Limaye TMH
3. Software Engineering Sommerville pearson Education

DATA COMPRESSION TECHNIQUIES

Course/Paper: 08BIT-102
BIT Semester- VIII

UNIT	CONTENT
I	Compression Techniques: Lossless, lossy, measure of performance, modeling & coding. Lossless compression: Derivation of average information, data models, uniquely decodable codes with tests, prefix codes, Kraft-Mc Millan inequality. Huffman coding: Algorithms, minimum variance Huffman codes, optimality, length extended codes, adaptive coding, Rice codes, using Huffman codes for lossless image compression.
II	Arithmetic coding with application to lossless compression. Dictionary Techniques: LZ77, LZ78, LZW Predictive coding: Burrows-Wheeler Transform and move-to-front coding, JPEG-LS Facsimile Encoding: Run length, T.4 and T.6
III	Lossy coding- Mathematical preliminaries: Distortion criteria, conditional entropy, average mutual information, differential entropy, rate distortion theory, probability and linear system models. Scalar quantization: The quantization problem, uniform quantizer, Forward adaptive quantization, non-uniform quantization-Formal adopting quantization, companded Quantization Vector quantization: Introduction, advantages, The Linde-Ruzo-Grey algorithm, lattice vector quantization.
IV	Differential encoding – Introduction, Basic algorithm, Adapt ive DPCM, Delta modulation, speech and image coding using delta modulation. Sampling in frequency and time domain, z-transform, DCT, DST, DWHT, quantization and coding of transform coefficient.
V	Sub band coding: Introduction, Filters, Basic algorithm, Design of Filter banks, G.722, MPEG. Wavelet based compression: Introduction, wavelets multi-resolution analysisand the scaling function implementation using filters.

Reference Books

1. Sayood K: Introduction to Data Compression: ELSEVIER 2005

INFORMATION ASSURANCE and SECURITY

Course/Paper: 08BIT-103
BIT Semester- VIII

UNIT	CONTENT
I	Elements of Number Theory: Divisibility and Euclid Algorithm, Primes and the Sieve of Eratosthenes, testing for primes, Prime Number Theorem, Euler's, Fermat's Little theorems, Congruences, Computing Inverse in Congruences, Legendre and Jacobi Symbols, Chinese Remainder Theorem, Algebraic Structures in Computing (Definitions, properties and Elementary Operations Only): Groups, subgroup, order of group, cyclic group, ring, field, division algorithm, polynomial over a field. Galois Field Elements of Information Theory: Entropy, redundancy of language, Key Equivocation & Unicity Distance, equivocation of a simple cryptographic system
II	Security Attacks: Active V/S Passive, Security Services, Security Mechanisms. Symmetric Cipher Model, Types of attacks on Encrypted messages. Classical Cipher Techniques: Caeser, Affine, Mono-alphabetic, Transposition, Poly-alphabetic Ciphers Private Key Cryptosystems: Block Cipher Principles, Fiestel Cipher, Concept of 'Confusion' and ''Diffusion' in block ciphers, Product Ciphers, Lucifer Algorithm. DES Algorithm, DES modes of operations, IDEA. Differential & Linear Cryptanal ysis (Introduction Only). S-box theory: Boolean Function, S-box design criteria, Bent functions, Propagation and nonlinearity, construction of balanced functions, S-box design. Link Vis End-to-End Encryption, Key Distribution in Symmetric Encryption
III	Public Key Cryptosystems: Principles of Public Key Cryptosystems, Factorization, RSA Algorithm, security analysis of RSA, Exponentiation in Modular Arithmetic. Key Management in Public Key Cryptosystems: Distribution of Public Keys, Distribution of Secret keys using Public Key Cryptosystems. Discrete Logarithms, Diffie-Hellman Key Exchange
IV	Message Authentication & Hashing: Birthday Paradox and General case of Duplications, Basic functions of Message Authentication and Hashing, Introduction to Hash & MAC algorithms. Digital Signatures: RSA Based, ElGamal Signatures, Undeniable Signatures. Authentication: Model of Authentication Systems, Impersonation, Substitution and spoofing games, Authentication schemes for mutual authentication based on shared secret, two-way public key, one-way public key, Mediated Authentication, One way Authentication.
V	X.509 Authentication Service: Certificates, Authentication Procedure, X.509 Version 3. E-Mail Security: PGP including management of keys in PGP, S/MIME. Network Security: IPSec, AH & ESP in Transport and Tunnel mode with multiple security associations (Key Management not Included). SSL (Protocols Only) Intrusion Detection: Audit Reports, Statistical Anomaly Detection, Rule based detection, honeypots, intrusion detection exchange formats. Password Protection: Lamport Hash, EKE Protocol

Reference Books

1. Stalling Williams: Cryptography and Network Security: Principles and Practices, 4th Edition Pearson Education, 2006
2. Kaufman Charlie et.al; Network Security: Private Communication in a Public World, 2nd Ed, PHI/Pearson.
3. Pieprzyk Josef and et.al; Fundamentals of Computer Security, Springer-Verlag, 2008.
4. Trappe & Washington, Introduction to Cryptography, 2nd Ed. Pearson.

MOBILE COMPUTING

Course/Paper: 08BIT-104.1
BIT Semester- VIII

UNIT	CONTENT
I	Introduction, issues in mobile computing, overview of wireless telephony: cellular concept, GSM: air-interface, channel structure, location management: HLR-VLR, hierarchical, handoffs, channel allocation in cellular systems, CDMA, GPRS.
II	Wireless Networking, Wireless LAN Overview: MAC issues, IEEE 802.11, Blue Tooth, Wireless multiple access protocols, TCP over wireless, Wireless applications, data broadcasting, Mobile IP, WAP: Architecture, protocol stack, application environment, applications.
III	Data management issues, data replication for mobile computers, adaptive clustering for mobile wireless networks, File system, Disconnected operations.
IV	Mobile Agents computing, security and fault tolerance, transaction processing in mobile computing environment.

UNIT	CONTENT
V	Ad Hoc networks, localization, MAC issues, Routing protocols, global state routing (GSR), Destination sequenced distance vector routing (DSDV), Dynamic source routing (DSR), Ad Hoc on demand distance vector routing AODV), Temporary ordered routing algorithm (TORA), QoS in Ad Hoc Networks, applications.

Reference Books

1. Vishnu Sharma, Mobile Computing ,S.K Kataria & Sons
2. Mobile communications, gochen schiller, pearson education
3. Mobile communications, Vishnu sharma, s.k.

NETWORK PROGRAMMING

Course/Paper: 08BIT-104.2
BIT Semester- VIII

UNIT	CONTENT
I	Introduction TCP/IP:, internetworking concepts and architecture, ARP, RARP, Internet protocol (Datagram delivery, routing, (ICMP), CIDR, introduction of UDP and TCP, EGP, BGP, RIP, OSPF, HELLO, NAT, VPN, client server model, BOOTP, DHCP, NFS
II	Socket Programming: Socket Fundamentals, Elementary TCP & UDP sockets, I/O multiplexing, socket options, elementary name and address conversion.
III	Advanced Sockets: Introduction to IPV6, IPV4 AND IPV6 interoperability Advanced name and address conversion, Daemon processes and intend, Advanced I/O and non blocking I/O, Broadcasting, Threads and IP options.
IV	X/OPEN Transport Interface (XTI): TCP client and servers name and address functions, UDP client and servers, streams and virtual. Private Networks.
V	Advanced Topics: Inter-process communication-Introduction, POSIX IPC & System V IPC, Introduction to pipes & FIFOS, Doors and Sun RPC (Introduction only).

Reference Books

1.Computer Networking With Internet Protocols And Technology, William Stallings, Pearson Education
2. J. F. Kurose and K. W. Ross, Computer Networking: A Top-Down Approach   Featuring the Internet, Addison-Wesley Publishing, 2nd edition, 2002
3. W. R. Stevens, UNIX Network Programming, Prentice Hall PTR, 2nd edition,   January 1998

ARTIFICIAL INTELLIGENCE

Course/Paper: 08BIT-104.3
BIT Semester- VIII

UNIT	CONTENT
I	Meaning and definition of artificial intelligence, Various types of production systems, Characteristics of production systems, Study and comparison of breadth first search and depth first search. Techniques, other Search Techniques like hill Climbing, Best first Search. A* algorithm, AO* algorithms etc, and various types of control strategies.
II	Knowledge Representation, Problems in representing knowledge, knowledge representation using propositional and predicate logic, comparison of propositional and predicate logic, Resolution, refutation, deduction, theorem proving, inferencing, monotonic and nonmonotonic reasoning.
III	Probabilistic reasoning, Baye's theorem, semantic networks scripts schemas, frames, conceptual dependency and fuzzy logic, forward and backward reasoning.

IV	Game playing techniques like minimax procedure, alpha-beta cut-offs etc, planning, Study of the block world problem in robotics, Introduction to understanding and natural languages processing.
V	Introduction to learning, Various techniques used in learning, introduction to neural networks, applications of neural networks, common sense, reasoning, some example of expert systems.

Reference Books

1. Charniak, E. : Introduction of Artificial Intelligence, Narosa Publishing House.
2. Winston, PH. : LISP, Narosa publishing House.
3. Clark, K.L. & McCabe; EG. : Micro-Prolog. Prentice Hall India, 1987.
4. Elaine Rich & Kevin Knight: Artificial Intelligence; Tata McGraw Hill.
5. Dan W. Patterson: Introduction to Artificial Intelligence and Expert System; PHI.

Laboratories: VIII Semester

DATA MINING AND WAREHOUSING LAB
Course/Paper: 08BIT-201
BIT Semester- VIII

The objective of the lab exercises is to use data mining techniques to use standard databases available to understand DM processes

using any DM tool)

1. Gain insight for running pre- defined decision trees and explore results using MS OLAP Analytics.

2. Using IBM OLAP Miner – Understand the use of data mining for evaluating the content of

multidimensional cubes.

3. Using Teradata Warehouse Miner – Create mining models that are executed in SQL.

(Portal work : The objective of this lab exercises is to integrate pre-built reports into a portal application)

4. Publish and analyze a business intelligence portal.

Metadata & ETL Lab: The objective of this lab exercises is to implement metadata import agents to pull metadata from

leading business intelligence tools and populate a metadata repository. To understand ETL processes

5. Import metadata from specific business intelligence tools and populate a meta data repository.

6. Publish metadata stored in the repository.

7. Load data from heterogeneous sources including text files into a pre-defined warehouse schema.

Case study

1. Design a data mart from scratch to store the credit history of customers of a bank. Use this credit

profiling to process future loan applications.

2. Design and build a Data Warehouse using bottom up approach titled 'Citizen Information

System'.

SOFTWARE TESTING & VALIDATION LAB
Course/Paper: 08BIT-202
BIT Semester- VIII

1. Hands of software engineering principal infrastructure.

2. Usage of front –end and back-end technology and package

Prepare the following document for three of the experiment listed below using software engineering methodology.

       a. Program analysis and project planning.

       b. Thorough study of the problem – identify project scope, objectives,

       c. Software requirement analysis.

3. Describe the individual phases /modules of the project, identify deliverables.

4. Software design

       a. Use work product-data dictionary, use case diagram and activity diagrams

       b. Sequence diagrams and add interface to class diagrams DFD, ER diagrams

       c. Software development and debugging using any front end back end tool

       d. Software verification and validation procedures

DATA COMPRESSION TECHNIQUIES LAB

Course/Paper: 08BIT-203
BIT Semester- VIII

1. Compress a file (bitmap format) having some diagram in it. Transfer the file to another system and decompress to display the original file.

2. Compress an audio file. Transfer the file to another system and decompress to display the original file.

3. Compress a video file. Transfer the file to another system and decompress to display the original file.

4. Implement Huffman coding with minimum variance, optimal non binary, extended adaptive.

5. Implement Applications & limitations of Huffman Codes (run length encoding, arithmetic coding predictive coding)

6. Implement Lossy Compression techniques-JPEG and its application. Error detection & correction: Parity, 1,2,n dimensions, Hamming codes, p-out-of-q codes

7. Implement dictionary based compression techniques – Lempel-Ziv-Welch, LZ77 & LZ-78.

Quantization: Scalar and Vector Quantization.

8. Implement Shannon Fano Algorithm.